KOICA
KOREA INTERNATIONAL COOPERATION AGENCY
825 Daewangpangyo-ro, Sujeng-gu, Seongnam-si, Gyeonggi-do, 461-833, Republic of Korea
Tel 82-31-7400-114 Fax 82-31-7400-655 http://www.koica.go.kr

²B.P.: 35415 Yaounde-Cameroon Tel: 222 20 71 44 Fax: 222 20 71 44 E-mail: cameroon@koica.go.kr

Restricted Invitation for Bids

(Procurement of Works)

Date: 23 February 2024

Invitation No.: 2024-0001

1. The KOICA (Korea International Cooperation Agency) Cameroon Office invites the following companies: **STS Cameroun Sarl; COMEC Sarl; Master PI Services Sarl; Kejang Noah Group** and **ENESKAY Sarl** to submit their bidding documents for the *Remodeling construction of the Yaoundé Emergency Center (CURY) and the National Trainer Training and Program Development Center (NTTPDC).*

Brief of Bidding

. Bid Title	Remodeling Works for CURY and NTTPDC, Cameroon
. Summary of Construction	Remodeling construction, including architectural/structural work, facility construction, and electrical work
. Duration	Until 180 days from the date of signing the contract (Shall commence 30 days from the date of signing the contract)
. Project Budget	USD 477,000 (Be exclusive of VAT and other applicable indirect taxes)

① Employer: KOICA Cameroon Office
② Bid Type: International Bidding, Open Competitive Bidding
③ Selection of the Successful Bidders: by Post-qualification
④ Bidder's qualification requirement: refer to Bid Data Sheet (BDS).
⑤ Name of Currency: USD
⑥ Submission deadline (Time and date, Place): Until 16:00, March 22, 2024, KOICA Cameroon Office
⑦ Bid Opening (Time and date, Place): 10:00, March 25, 2024, KOICA Cameroon Office

※ For further information, please refer to Bid Data Sheet (BDS). Original hard copy can be found at P.O. Box 35415, Yaounde, Cameroon, KOICA Office.

2. The available budget for this remodeling construction assignment is USD 477,000 and Bidders' Proposals should not exceed this budget. Any bid exceeding the project budget may result in rejection of its bid.

3. The Bidding Documents include the following documents:

   Section 1 - Instructions to Bidders (ITB)
   Section 2 - Bid Data Sheet (BDS)
   Section 3 – Bidding Forms
   Section 4 – Bill of Quantities
   Section 5 – Drawings
   Section 6 - Specification
   Section 7 - Requirement & Scope of Work
   Section 8 - General Conditions of Contract
   Section 9 - Special Conditions of Contract
   Section 10 - Contract Forms

4. Language of Proposal: English

5. KOICA Cameroon Office requires that bidders and contractors observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, KOICA;
   (a) will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
   (b) will recognize a contractor as ineligible, for a period determined by KOICA.

6. KOICA will receive only sealed envelopes from eligible bidders with the official seal or signature of the bidder.

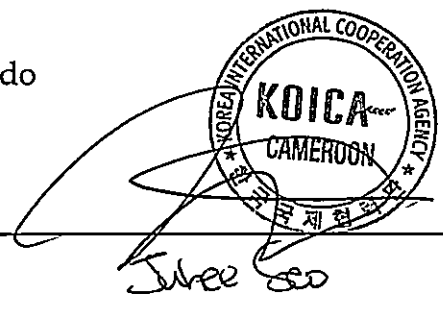
7. Interested eligible bidders may obtain further information on the bid form and inspect the bidding documents at KOICA Cameroon Office (cameroon@koica.go.kr)

8. All bids must be accompanied by a bid security of not less than five percent (5%) of Total Bid Price or stated fixed amount, and must be delivered in accordance with the Instructions to Bidders on or before 16:00, March 22, 2024.

9. The bidders shall remain committed by their offers from the deadline for the submission of tenders till April 08, 2024

10. KOICA will not be responsible for any costs or expenses incurred by bidders in connection with the preparation or delivery of bids.

ZIP Code: N/A
Address: P.O. Box 35415, Yaounde, Cameroon
Website: https://www.koica.go.kr/sites/cmr_kr/index.do
Telephone: +237 2 22 20 71 44
E-mail: cameroon@koica.go.kr
Person in charge: Mme. SEO Juhee, Deputy Director



A. Seismic Qualification Certificates: For booster pumps, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

7.2.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For booster pumps to include in emergency, operation, and maintenance manuals.

7.2.6 QUALITY ASSURANCE:

Shall comply the followings or other equivalent approved standards.

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application. B. ASME Compliance: Comply with ASME B31.9 for piping.

C.UL Compliance for Packaged Pumping Systems:
1. UL 778, "Motor-Operated Water Pumps."

D. Booster pumps shall be listed and labeled as packaged pumping systems by testing agency acceptable to authorities having jurisdiction.

7.2.7 DELIVERY, STORAGE, AND HANDLING

A.Retain protective coatings and flange's protective covers during storage.

7.2.8 COORDINATION

A.Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 - PRODUCTS;

a. Duplex, Automatic, Alternating Starter: Switches lead pump to lag main pump and to two-pump operation.

6. Pump Operation and Sequencing: Pressure-sensing method or flow-sensing method.

a. Time Delay: Controls pump on-off operation; adjustable from 1 to 60 seconds.

7. VFC: Voltage-source, pulse-width, modulating-frequency converter for each pump.
8. Manual Bypass: Magnetic contactor arranged to transfer to constant-speed operation upon VFC failure.
9. Instrumentation: Suction and discharge pressure gages.
10. Lights: Running light for each pump.
11. Alarm Signal Device: Sounds alarm when backup pumps are operating.

a. Time Delay: Controls alarm operation; adjustable from 1 to 60 seconds, with manual reset.

12. Thermal-bleed cutoff.
13. Low-suction-pressure cutout.
14. High-suction-pressure cutout.
15. Low-discharge-pressure cutout.
16. High-discharge-pressure cutout. G. Base: Structural steel.

H.Capacities and Characteristics:

1. Booster-Pump Capacity: 2.0 L/s Each.
2. Minimum Inlet Pressure: 0.04 bar.
3. Maximum Inlet Pressure: 1.8bar.
4. Discharge Pressure: 3 bar for domestic booster and 6 bar for fire booster.
5. Low-Suction-Pressure Shutoff: 0.04bar.
6. High-Discharge-Pressure Shutoff: 3.0bar for domestic and 6 bar for fire booster .
7. Header Size: Manufacturer data.

8. Each of Two Lag Pumps:

a. Capacity: 2.0 (L/s).
b. Total Dynamic Head: 3bar for domestic booster and 6 bar for fire booster.
c. Speed: Manufacturer data.
d. Electrical Characteristics:

1) Motor Horsepower: Manufacturer data.
2) Volts: 240.

3) Phases: Manufacturer data. 4) Hertz: 50.

7.2.10 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors.

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in NFPA 70.

PART 3 - EXECUTION

7.2.11 EXAMINATION

A. Examine roughing-in for booster pumps to verify actual locations of piping connections before booster-pump installation.

7.2.12 INSTALLATION

A. Equipment Mounting:

1. Install booster pumps on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 3.4

B.Support connected domestic-water piping so weight of piping is not supported by booster pumps.

7.2.13 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing. C. Tests and Inspections:

3) Phases: Manufacturer data. 4) Hertz: 50.

7.2.10 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors.

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in NFPA 70.

PART 3 - EXECUTION

7.2.11 EXAMINATION

A. Examine roughing-in for booster pumps to verify actual locations of piping connections before booster-pump installation.

7.2.12 INSTALLATION

A. Equipment Mounting:

1. Install booster pumps on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 3.4

B.Support connected domestic-water piping so weight of piping is not supported by booster pumps.

7.2.13 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing. C. Tests and Inspections:

1. Perform visual and mechanical inspection.
2. Leak Test: After installation, charge booster pump and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start booster pumps to confirm proper motor rotation and booster-pump operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Pumps and controls will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

7.2.14 STARTUP SERVICE

A.Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

B. Adjust booster pumps to function smoothly, and lubricate as recommended by manufacturer.

C. Adjust pressure set points.

D. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting booster pump to suit actual occupied conditions.

7.2.15 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain booster pumps.

DIVISION 8: MEDICAL GAS CHAMBER

8.1 SUMARY

- Repair broken vacuum pump (Replace Engine that is bad)
- Replace pipes from bottles to gas chamber and stop valves
- Replace air filters
- Replace broken oxygen regulator

8.2 *DETAILS*

ENGINE:

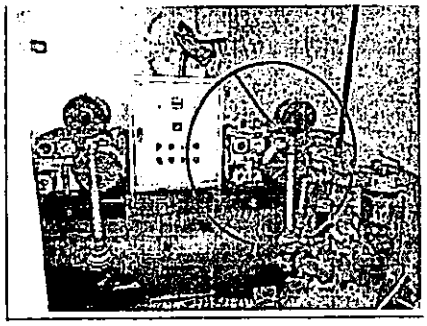


Fig 1

Change Current Engine of the Vacuum pump Circled.

Two Pumps are Supposed to work intermittently but one

Pump Capacity:

DIVISION 9: INTERNAL PAINTING

PART 1 - GENERAL

9.1. SUMMARY

A. Section includes water proofing treatment on contaminated surfaces, surface preparation and the application of paint systems on the following interior substrates:

1. Steel and iron.
2. Gypsum board.
3. Plywood wall cladding
4. Plaster.

B. Hack out all damping areas on the walls and slabs, progress to treatment of surfaces
C. Apply a new layer of paint on all internal surfaces
D. Repainting of all hand rails

9.2. DEFINITIONS

A. MPI Gloss Level 1 (Matte): Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523 or equivalent as validated by the consultant.

B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523 or equivalent as validated by the consultant.

C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523 or equivalent as validated by the consultant.

D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523 or equivalent as validated by the consultant.

E. MPI Gloss Level 5 (Semi-Gloss): 35 to 70 units at 60 degrees, according to ASTM D523 or equivalent as validated by the consultant.

F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523 or equivalent as validated by the consultant.

G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523 or equivalent as validated by the consultant.

9.3. ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

B. Samples: For each type of paint system and in each color and gloss of topcoat.

9.4. QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.

   a. Vertical and Horizontal Surfaces: Provide samples of at least 9 sq. m.
   b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

   a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

PART 2 - PRODUCTS

9.5. PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists." B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated. C. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

9.6. EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Fiber-Cement Board: 12 percent.
3. Masonry (Clay and CMUs): 12 percent.
4. Wood: 15 percent.
5. Gypsum Board: 12 percent.
6. Plaster: 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

9.7. PREPARATION

A. Treat all contaminated surfaces caused by moisture or by the growth of moss.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

9.8. APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

9.9. INTERIOR PAINTING SCHEDULE

A. Steel Substrates: Semi-Gloss or equivalent as validated by the consultant.

DIVISION 10: ELECTRICITY

PART 1 - GENERAL

10.1 SUMMARY

A.Replace all internal lighting fixtures to LEDS

10.2DEFINITIONS

- Fixture: See "Luminaire."
- LED: Light-emitting diode.
- Lumen: Measured output of lamp and luminaire, or both.
- Luminaire: Complete lighting unit, including lamp, reflector, and housing.

10.3ACTION SUBMITTALS

- Product Data: For each type of product, arranged by designation.
- Samples

10.4CLOSEOUT SUBMITTALS

- Operation and maintenance data.

10.5WARRANTY

- Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- Warranty Period: one year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

10.6LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
B. Standards:
   - ENERGY STAR certified.
   - California Title 24 compliant.
   - NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.
   - FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
   - UL Listing: Listed for damp location.
   - Recessed luminaires shall comply with NEMA LE 4. C.
   - CRI of 70 CCT of 4100 K.
C. Rated lamp life of 50,000 hours to L70.
D. Lamps dimmable from 100 percent to 0 percent of maximum light output.
E. Internal driver.
F. Nominal Operating Voltage: 240 V ac.
   - Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.
G. Housings:
   - Extruded-aluminum housing and heat sink.

- Anodized powder-coat painted finish.

10.7SURFACE MOUNT, LINEAR

A. Minimum 750 lumens. Minimum allowable efficacy of 80 lumens per watt.
B. Integral junction box with conduit fittings.

10.8SURFACE MOUNT, NONLINEAR

A. Minimum 750 lumens. Minimum allowable efficacy of 80 lumens per watt.
B. Integral junction box with conduit fittings.

10.9MATERIALS

C. Metal Parts:
    i. Free of burrs and sharp corners and edges.
    ii. Sheet metal components shall be steel unless otherwise indicated.
    iii. Form and support to prevent warping and sagging
D. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
E. Diffusers, and Globes:
    - diffuse glass
    - Acrylic: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
    - Glass: Annealed crystal glass unless otherwise indicated.
    - Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.
F. Housings:
    - Extruded-aluminum housing and heat sink.
    - Anodized powder-coat painted finish.

10.10 METAL FINISHES

- Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

10.11 LUMINAIRE SUPPORT

C. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
D. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
E. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).
F. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.
G. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

10.12 INSTALLATION

- Replace all internal lighting fixtures with LEDs.
- Where the ceiling would be changed, fixtures will be selected to match choice of ceiling
- Where the ceiling is not changed, LED light shall match existing dimensions of lamps in place
- Replace only lamps in exterior lights

10.13 FIELD QUALITY CONTROL

Perform the following tests and inspections:

- Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
- Luminaire will be considered defective if it does not pass operation tests and inspections.
- Prepare test and inspection reports.

DIVISION 11: AIR CONDITIONERS

PART I - GENERAL

11.1 SUMMARY

H. Dismantle and replace split-system air-conditioning and heat-pump units consisting of separate evaporator-fan and compressor-condenser components.

I. Verify existing piping for leakages and repair or change completely

11.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Check list showing characteristic of existing ACs and new ACs for replacement

11.3 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

11.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

11.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE Compliance :

1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - " Procedures," and Section 7 - "Construction and System Start-up."

C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1

11.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fails in materials or workmanship within specified warranty period.

1.Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

11.7 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Carrier Corporation; Home Comfort and HVAC Building & Industrial Systems.
2. Coleman Company Inc. (The).
3. First Operations LP.
4. Friedrich Air Conditioning Company.
5. Koldwave, Inc.; a Mestek company.
6. Lennox International Inc.
7. Mitsubishi Electric & Electronics USA, Inc.; HVAC Advanced Products Division.
8. Mitsubishi Electric Sales Canada Inc.
9. Mitsubishi Heavy Industries America, Inc.
10. SANYO North America Corporation; SANYO Fisher Company.
11. Trane; a business of American Standard companies.
12. YORK; a Johnson Controls company.
13. Other approved & UL listed manufacturer.

11.8 NDOOR UNITS 5TONS (18 kW) OR LESS

A.Wall-Mounted, Evaporator-Fan Components:

1. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection.
2. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermalexpansion valve. Comply with ARI 206/110.

3. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements; with refractory ceramic support bushings, automatic-reset thermal cutout, built-in magnetic contactors, manual-reset thermal cutout, airflow proving device, and one-time fuses in terminal box for over current protection.

4. Fan: Direct drive, centrifugal.
5. Fan Motors:

    a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements.
    b. Multi tapped, multispeed with internal thermal protection and permanent lubrication.
    c. Enclosure Type: Totally enclosed, fan cooled.
    d. NEMA Premium (TM) efficient motors as defined in NEMA MG 1.
    e. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
    f. Mount unit-mounted disconnect switches on [exterior] [interior] of unit.
    g. <Insert unique motor characteristics>.

6. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
7. Condensate Drain Pans:

    a. Unless there are leakages use existing condensate piping. Otherwise repair any leakages with one percent slope in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and humidifiers, and to direct water toward drain connection.
        1) Length: Extend drain pan downstream from leaving face to comply with ASHRAE 62.1.
        2) Depth: A minimum of 25mm deep.

    b. Single-wall, stainless-steel sheet.
    c. Double-wall, galvanized-steel sheet with space between walls filled with foam insulation and moisture-tight seal.
    d. Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on one end of pan.
        1) Minimum Connection Size: NPS 1 (DN 25).

    e. Pan-Top Surface Coating: Asphaltic waterproofing compound.
8. Air Filtration Section:

a. General Requirements for Air Filtration Section:

1) Comply with NFPA 90A.
2) Minimum Arrestance: According to ASHRAE 52.1 and MERV according to ASHRAE 52.2.
3) Filter-Holding Frames: Arranged for flat or angular orientation, with access doors on both sides of unit. Filters shall be removable from one side or lifted out from access plenum.

b. Disposable Panel Filters:

1. Factory-fabricated, viscous-coated, flat-panel type.
2. Thickness: 50 mm or more.
3. Arrestance according to ASHRAE 52.1: 80.
4. Merv according to ASHRAE 52.2:5.
5. Media: Interlaced glass fibers sprayed with nonflammable adhesive and antimicrobial agent.
6. Frame: Galvanized steel, with metal grid on outlet side, steel rod grid on inlet side, and hinged; with pull and retaining handles.

11.9 OUTDOOR UNITS 5TONS (18 kW) OR LESS

A.Air-Cooled, Compressor-Condenser Components:

1. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
2. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation device. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

   a. Compressor Type: Scroll.
   b. Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
   c. Refrigerant Charge: R-407C or R-410A.
   d. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid sub cooler. Comply with ARI 206/110.
3. Fan: Aluminum-propeller type directly connected to motor.
4. Motor: Permanently lubricated, with integral thermal-overload protection.
5. Low Ambient Kit: Permits operation down to 5 deg C).
6. Mounting Base: Polyethylene.

11.10 ACCESSORIES

A. Control equipment and sequence of operation shall be as approved submittal of manufacturer.

B. Thermostat: Low voltage with sub base to control compressor and evaporator fan.

C. Thermostat: Wireless infrared functioning to remotely control compressor and evaporator fan, with the following features:

1. Compressor time delay.
2. 24-hour time control of system stop and start.
3. Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.
4. Fan-speed selection including auto setting.

D. Automatic-reset timer to prevent rapid cycling of compressor.

E. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

F. Drain Hose: For condensate.

11.11 CAPACITIES AND CHARACTERISTICS

A. Cooling Capacity:
   1. Total: Refer to equipment schedule on dwgs (kW).
   2. Sensible: Refer to equipment schedule on dwgs (kW).
   3. EER: min 10.0Btu/wh.
   4. Moisture Removal: ..... (L/h).
   5. Entering-Air Temperature:
      a. Dry Bulb: 32deg C.
      b. Wet Bulb:.. deg C.
   6. Leaving-Air Temperature:
      a. Dry Bulb: 36deg

B. Heating Capacity:

1. At least maintain characteristic of defective AC or upgrade to a better capacity.

2. Electric Heating Coil:

   a. Total Capacity: Refer to equipment schedule on dwgs kW.
   b. Volts: 380/220.
   c. Phase: Single / [Poly -Refer to equipment schedule on dwgs or manufacturer data sheet.
   d. Hertz: 50.

C. Indoor Unit:

1. Fan Motor Electrical Characteristics:

   a. Volts: 220.
   b. Phase: Single/Poly Refer to manufacturer data.
   c. Hertz: 50.

2. Airflow: Refer to equipment schedule on dwgs

(L/s). D. Outdoor Unit:

1. Type: Air cooled.
2. Electrical Characteristics:

   a. Volts: 380/220.
   b. Phase: Single /Poly. Refer to equipment schedule on dwgs or manufacturer data
   c. Hertz: 50.
   d. Minimum Circuit Ampacity: Refer to manufacturer data.
   e. Maximum Overcurrent Protection: Refer to manufacturer data.
   f. Fan Motor Full-Load Amperes: Refer to manufacturer data.
   g. Compressor Full-Load Amperes: Refer to manufacturer data.
   h. Compressor Locked-Rotor Amperes: Refer to manufacturer data.
   i. Sound-Pressure Level: max 40 dBa.

PART 3 - EXECUTION

11.12 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Check existing drain and condensate piping for leaks and replace or repair

D. Equipment Mounting:

1. Install ground-mounted, compressor-condenser components on cast-in-place concrete equipment base(s).
2. Install ground-mounted, compressor-condenser components on polyethylene mounting base.

E. Install and connect pre charged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

11.13 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.

D. Prepare test and inspection reports.

11.14 DEMONSTRATION

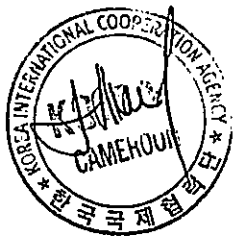
A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units.

DIVISION 12: DAMAGE DOORS AND NEW DOORS FOR NEW SPACES

12.15 SUMMARY

A. Replace all existing damaged steel and wooden doors as indicated on the plan

12.16 ACTION SUBMITTALS



A. Attached layout plan showing all doors to be replaced
B. Sample locks to be used for doors

12.17 CLOSEOUT SUBMITTALS

A. Checklist showing all verification that has been done in doors.

12.18 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components door that fails.

1.Warranty Period: One year from date of Substantial Completion.

PART 2 – PRODUCTS

12.19 MATERIAL

Maintain material for door panel as on site. Just replace door

12.20 SCHEDULED DOOR HARDWARE

A. Provide products for each.

12.21 . HINGES

Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

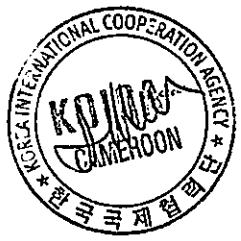
12.22 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule.

B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Mortise Locks: Minimum 19-mm latchbolt

throw.



C. Lock Backset: 70 mm unless otherwise indicated.
D. Lock Trim:

1. Description: As indicated on Drawings.
2. Levers: Cast.
3. Escutcheons (Roses): Cast.
4. Dummy Trim: Match lever lock trim and escutcheons.

E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

F. Mortise Locks: BHMA A156.13; Operational Grade 1; stamped steel case with steel or brass parts; Series 1000.

12.23 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

A. Self-Latching Flush Bolts: BHMA A156.3, Type 27; minimum 19-mm throw; with dust-proof strikes designed for mortising into door edge.
B. EXIT DEVICES AND AUXILIARY ITEMS

Exit Devices and Auxiliary Items: BHMA A156.3.

12.24 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver. Provide cylinder from same manufacturer of locking devices.

12.25 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.

1. No Master Key System: Only change keys operate cylinders.

a. Provide three cylinder change keys.

B. Keys: Nickel silver.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

a. Notation: "DO NOT DUPLICATE."

12.26 ACCESSORIES FOR PAIRS OF DOORS

A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release; and with internal override.

B. Carry-Open Bars: BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.

C. Astragals: BHMA A156.22.

12.27 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

12.28 MECHANICAL STOPS AND HOLDERS

A. Wall- and Floor-Mounted Stops: BHMA A156.16.

12.29 DOOR GASKETING

A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

B. Maximum Air Leakage: When tested according to ASTM E283 with tested pressure differential of 75 Pa, as follows:

1. Smoke-Rated Gasketing: 3 cu. m per minute/sq. m of door opening.
2. Gasketing on Single Doors: 3 cu. m per minute/sq. m of door opening.
3. Gasketing on Double Doors: 0.000774 cu. m/s per m of door opening.

12.30 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

12.31 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

PART 3 - EXECUTION

12.32 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights indicated on Drawings unless otherwise indicated or required to comply with governing regulations.

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

C. Hinges: Install with number not fewer than the number recommended by manufacturer for application indicated or one hinge for every 750 mm of door height, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Lock Cylinders: Install construction cores to secure building and areas during construction period.

E. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant.

F. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

G. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

1. Do not notch perimeter gasketing to install other surface-applied hardware.

I. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

J. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

12.33 ADJUSTING

A. Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements

DIVISION 13: GENERAL TILE WORKS

13.1 SUMMARY

- Hack out and replace all damage floor tiles, tiles on counter top in nursing call room and skirting

13.2 ACTION SUBMITALS

A. Product Data: For each type of product.
B. Samples: For each type of exposed finish required showing color and type.
C. Method statement for each installation

13.3 EXECUTION

A. Refer to Division for details on hacking out and installation of tiles

DIVISION 14: STERILIZATION ROOM

14.1 SUMMARY

- Build wall to close door between sterilization clean room and contaminated room
- Create another door at the west end close to the server room to access sterilization room as shown on plan
- Create a change area with another door to enter clean area
- Create a PVC Stripe falls wall to protect damping around the server room wall.
- Create a counter top of 1.0x1.0x1.0 with openings on both site between sterilization clean room and contaminated room, operation rooms and external corridor. Counter shall be done with aluminum profiles and double glass of 3x3 with a fine film between the glass. Openings shall be created on both sites with a connection mechanism that allow only one site to be open per time. The counter shall be of concrete of 8 cm thick with a 1x1 tiles placed on top without any joint.
- Install extractor fans to extract any contaminated air from sterilization room
- Re-cable room to meet up with demands of the room

14.2 ACTION SUBMITALS

A. Product Data: For each type of product.
B. Samples: For each type of material to be used.
C. Method statement for each installation.

14.3 CLOSEOUT SUBMITTALS

B. Checklist showing all verification on doors and door hardware, and extractors.

14.4 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door that fails and extractors within a period of one year.

14.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

14.6 COUNTER TOP WITH ALUMINUM WINDOW

PRODUCTS

14.6.1 CONCRETE FOR COUNTER TOP

A. Concrete a counter top on existing of window to respect the requirements of Section 3.4 above

B. Proceed to place 1 cm thick ceramic tiles on the counter top of dimension 1x1 m2 without any joints. Color of tiles as validated by the consultant.

14.6.2 ALUMINUM WINDOWS ON COUNTER TOP

A. Types: As indicated on Drawings.

B. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.

1. Thermally Improved Construction: Fabricate frames, sashes, and muntins with an integral, concealed, low-conductance thermal barrier located between exterior materials and window members exposed on interior side in a manner that eliminates direct metalto-metal contact.

C. Glass: Transparent annealed Laminated glass of 7mm (3+1+3).

D. Hardware, General: Provide manufacturer's standard corrosion-resistant hardware sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and Finish: As indicated by manufacturer's designations. E. Horizontal-Sliding Window Hardware:

- Sill Cap/Track: Designed to comply with performance requirement indicated and to drain to the exterior.
- Locks and Latches: Operated from the outside only.
- Roller Assemblies: Low-friction design.

F. Maintain a locking system for both inside and outside window such that only one window of the windows can open at a time. Use a connection hardware that holds the other window while one is open

G. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

FABRICATION

A. Source Limitations: Obtain each color and pattern of curtain fabric and trim from one dye lot.

B. Fire-Test-Response Characteristics: For fabrics treated with fire retardants, provide products that pass NFPA 701 as determined by testing of fabrics that were treated using treatmentapplication method intended for use for this Project by a testing and inspecting agency acceptable to authorities having jurisdiction.

C. Drape: SHADE 01

1. Heading:
   a. Roll Pleats: 60 percent fullness.
   b. Heading Accessories:

      1) Nonwoven buckram.
      2) Woven snap tape, 22 mm wide, with nickel-plated snaps at 102 mm o.c.. 3) Hooks.

2. Drapery Fabric: Full Black Out Curtains
   a. General: Curtains shall be custom made to fit the space indicated on field.
   b. Curtains have stainless steel grommets spaced 6 inches apart.
   c. Side seams and bottom seams are 1 inch double, with center seams also double sewn.
   d. Blackout Curtains are made 15 percent wider than the track size to allow for fullness.
   e. Curtains cut to be about 2 inches too long to block any light from entering along the bottom edge.
   f. Curtains cut to "Kiss the Floor".
   g. Material: Curtains are commercial grade 100 percent blackout fire retardant material and passes the NFPA 701 Small Scale Fire Test.
   h. Valance: Curtains provided with a 12 inch valence.
   i. Color: Blackout Curtain Fabric: Select solid fabric from manufacturer's standard selection as follows:

      1) Black/Black Textron, Polyester

3. Accessories: Provide with the following.
   a. Wall Mounted Tie Back
   b. Split with Velcro Overlap

15.3.6.DRAPE FABRICATION

A. Fabricate drapes in heading styles and fullnesses indicated. Fabricate headings to stand erect. If less than a full width of fabric is required to produce panel of

specified fullness, use equal widths of not less than one-half width of fabric located at ends of panel.

1. One-Way-Stacking Drapes: Add 127 mm to overall width for returns.
2. Center-Opening Drapes: Add 254 mm to overall width for overlap.

B. Seams: Sew vertical seams with twin-needle sewing machine with selvage trimmed and overlocked. Join widths so that patterns match and vertical seams lay flat and straight without puckering. Horizontal seams are unacceptable.

C. Side Hems: Double-turned, 38-mm-wide hems consisting of three layers of fabric, and blindstitched so that stitches are invisible on face of drape.

D. Bottom Hems: Double-turned, 102-mm-wide hems consisting of three layers of fabric, and weighted and blind stitched so that weights and stitches are invisible on face of drape.

1. Sew in square lead weights at each seam and at panel corners.

E. Linings: Equal to widths of drapery fabric and joined to drapery fabric at top by inside invisible seam, and hand stitched at side hems and shadowed with 38-mm return of face fabric.

1. Bottom Hem: Blind stitch to drapery fabric.

PART 3 - EXECUTION

15.3.7.DRAPERY TRACK INSTALLATION

A. Install track systems according to manufacturer's written instructions, level and plumb, and at height as measured in the field.

B. Isolate metal parts of tracks and brackets from concrete, masonry, and mortar to prevent galvanic action. Use tape or another method recommended in writing by track manufacturer.

15.3.8.DRAPE INSTALLATION

A. Where drapes abut overhead construction, hang drapes so that clearance between headings and overhead construction is 6.4 mm.

B. Where drapes extend to floor, install so that bottom hems clear finished floor by not more than 25 mm and not less than 13 mm.

C. After hanging drapes, do the following:

1. Test and adjust each drapery track to produce unencumbered, smooth operation.
2. Steam and dress down drapes as required to produce crease- and wrinkle-free installation.
3. Remove and replace drapes that are stained or soiled.

15.4 EXHAUST FAN EXTRACTORS AND DUCT WORK

METAL DUCTS

PART I - GENERAL

15.4.1 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and designs

B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

15.4.2 ACTION SUBMITTALS

A.Product Data: For each type of the following products:

1. Adhesives.
2. Sealants and gaskets.

15.4.3 QUALITY ASSURANCE

A. Mockups:

1. Before installing duct systems, build mockups representing static-pressure classes in excess of (750 Pa). Build mockups to comply with the following requirements, using materials indicated for the completed Work:

   a. Five transverse joints.
   b. One access door(s).
   c. Two typical branch connections, each with at least one elbow.

d. Two typical flexible duct or flexible-connector connections for each duct and apparatus.
e. One 90-degree turn(s) with turning vanes.
f. One fire damper.

2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 – PRODUCTS

15.4.4 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: Z180.
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Factory- or Shop-Applied Antimicrobial Coating:

1. Apply to the surface of sheet metal that will form the interior surface of the duct. An untreated clear coating shall be applied to the exterior surface.
2. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
3. Coating containing the antimicrobial compound shall have a hardness of 2H, minimum, when tested according to ASTM D 3363.
4. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
5. Shop-Applied Coating Color: [Black] [White].
6. Antimicrobial coating on sheet metal is not required for duct containing liner treated with antimicrobial coating.

D. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

E. Tie Rods: Galvanized steel, 6-mm minimum diameter for lengths 900 mm or less; 10-mm minimum diameter for lengths longer than 900 mm.

15.4.5 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width: 76 mm.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 2500 Pa, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 0 to plus 45 deg C).
9. Substrate: Compatible with galvanized sheet steel.
10. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
11. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers"or equivalent approved standards. C. Water-Based Joint and Seam Sealant:

- Application Method: Brush on.
- Solids Content: Minimum 65 percent.
- Shore A Hardness: Minimum 20.
- Water resistant.
- Mold and mildew resistant.
- VOC: Maximum 75 g/L (less water).
- Maximum Static-Pressure Class: (2500 Pa), positive and negative.
- Service: Indoor or outdoor.
- Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Solvent-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Base: Synthetic rubber resin.
3. Solvent: Toluene and heptane.
4. Solids Content: Minimum 60 percent.
5. Shore A Hardness: Minimum 60.
6. Water resistant.
7. Mold and mildew resistant.
8. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
9. VOC: Maximum 395 g/L.
10. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic
    Emissions from Various Sources Using Small-Scale Environmental Chambers."
11. Maximum Static-Pressure Class: (2500 Pa), positive or negative.
12. Service: Indoor or outdoor.
13. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

E.Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

15.4.6 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," (Table 5-1M), "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

H. Trapeze and Riser Supports:

Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

PART 3 - EXECUTION

15.4.7 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and
Flexible" unless otherwise indicated.

C. Install ducts with fewest possible joints.

D. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

E. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

F. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

G. Install ducts with a clearance of (25 mm), plus allowance for insulation thickness.

H. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

I. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 38 mm.

J. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers.

K. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

15.4.8 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter.

D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Repair or replace damaged sections and finished work that does not comply with these requirements.

15.4.9 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct
Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible." 2. Outdoor, Supply-Air Ducts: Seal Class A.
3. Outdoor, Exhaust Ducts: Seal Class C.
4. Conditioned Space, Supply-Air Ducts in Pressure Classes (500 Pa) and Lower: Seal Class C.
5. Conditioned Space, Exhaust Ducts: Seal Class B.

15.4.10HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 100 mm thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 100 mm thick.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible,"(Table 5-1M), "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within (610 mm) of each elbow and within (1200 mm) of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 5 m.

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

15.4.11CONNECTIONS

A. Make connections to equipment with flexible.

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

15.4.12DUCT CLEANING

A. Clean new duct system(s) before testing, adjusting, and balancing.

B. Use service openings for entry and inspection.

1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Section 233300 "Air Duct Accessories" for access panels and doors.
2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling to gain access during the cleaning process.

C. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Supply-air ducts, dampers, actuators, and turning vanes.
6. Dedicated exhaust and ventilation components and makeup air systems.

D. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
5. Provide drainage and cleanup for wash-down procedures.
6. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to

manufacturer's written instructions after removal of surface deposits and debris.

FLEXIBLE DUCTS

PART 1 - GENERAL

15.4.13SUMMARY

A. Section Includes:

1. Non-insulated flexible ducts.

15.4.14ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS: Shall comply with the followings or other equivalent approved standards & requirements.

15.4.15ASSEMBLY DESCRIPTION

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

C. Comply with the Air Diffusion Council's "ADC Flexible Air Duct Test Code FD 72-R1."

D. Comply with ASTM E 96/E 96M, "Test Methods for Water Vapor Transmission of Materials."

2.2 NON-INSULATED FLEXIBLE DUCTS

A. Non-Insulated, Flexible Duct: UL 181, Class 1, two-ply vinyl film supported by helically wound, spring-steel wire.

1. Pressure Rating: 1500 Pa positive and 250 P) negative.
2. Maximum Air Velocity: 10 m/s.
3. Temperature Range: Minus 5 to plus 50 deg C.

B. Non-Insulated, Flexible Duct: UL 181, Class 1, multiple layers of aluminum laminate supported by helically wound, spring-steel wire.

1. Pressure Rating: 1500 Pa positive and 250 Pa negative.
2. Maximum Air Velocity: 10 m/s.
3. Temperature Range: Minus 5 to plus 50 deg C.

15.4.16FLEXIBLE DUCT CONNECTORS

A. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 75 through 460 mm, to suit duct size.

B. Non-Clamp Connectors: Adhesive, Liquid adhesive plus tape or Adhesive plus sheet metal screws.

PART 3 - EXECUTION

15.4.17INSTALLATION

A. Install flexible ducts according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install in indoor applications only. Flexible ductwork should not be exposed to UV lighting.

C. Connect terminal units to supply ducts directly or with maximum 300-mm lengths of flexible duct. Do not use flexible ducts to change directions.

D. Connect diffusers or light troffer boots to ducts directly or with maximum 1500-mm lengths of flexible duct clamped or strapped in place.

E. Connect flexible ducts to metal ducts with adhesive, liquid adhesive plus tape, draw bands or adhesive plus sheet metal screws.

F. Install duct test holes where required for testing and balancing purposes.

G. Installation:

1. Install ducts fully extended.
2. Do not bend ducts across sharp corners.

3. Bends of flexible ducting shall not exceed a minimum of one duct diameter.
4. Avoid contact with metal fixtures, water lines, pipes, or conduits.
5. Install flexible ducts in a direct line, without sags, twists, or turns.

H. Supporting Flexible Ducts:

1. Suspend flexible ducts with bands 38 mm wide or wider and spaced a maximum of 1200 mm apart. Maximum centerline sag between supports shall not exceed 13 mm per 300 mm.
2. Install extra supports at bends placed approximately one duct diameter from center line of the bend.
3. Ducts may rest on ceiling joists or truss supports. Spacing between supports shall not exceed the maximum spacing per manufacturer's written installation instructions.
4. Vertically installed ducts shall be stabilized by support straps at a maximum of 1800 mm o.c.

AXIAL EXHAUST FANS

PART 1 - GENERAL

15.4.18SUMMARY

A. Section Includes:

1. Tube axial fans.
2. Vane axial fans.

15.4.19ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, furnished specialties, and accessories for each fan.
2. Certified fan performance curves with system operating conditions indicated.
3. Certified fan sound-power ratings.
4. Motor ratings and electrical characteristics, plus motor and electrical accessories.
5. Material thickness and finishes, including color charts.
6. Dampers, including housings, linkages, and operators.

7. Fan speed controllers.

15.4.20CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For axial fans to include in emergency, operation, and maintenance manuals.

15.4.21MAINTENANCE MATERIAL SUBMITTALS

A.Belts: One set(s) for each belt-driven unit.

PART 2 - PRODUCTS

15.4.22PERFORMANCE REQUIREMENTS

A. AMCA Compliance: Comply with AMCA performance requirements and bear the AMCA-
Certified Ratings Seal.

B. Capacities and Characteristics:

1. Airflow: See drawings.
2. External Static Pressure: See drawings.
3. Fan Diameter: Selected model.
4. Brake Horse power: Selected to comply with air flow.
5. Drive Type: Selected to comply with air flow.
6. Fan Rpm: See drawings.
7. Motor: Electrical Characteristics:

   - Motor Size: See manufacturer data.
   - Motor Rpm: See manufacturer data.
   - Volts: 380/220V.
   - Phase: See manufacturer data.
   - Hertz: 50.
   - Full-Load Amperes: See manufacturer data.
   - Minimum Circuit Ampacity: See manufacturer data.
   - Maximum Overcurrent Protection: See manufacturer data.

8. Sound Power: Max.75dB
9. Vibration Isolators: Spring isolators having a static deflection of [1 inch (25 mm)].

15.4.23TUBEAXIAL FANS

A. Description: Fan wheel and housing, factory-mounted motor with belt or direct drive, an inlet cone section, and accessories.
B. Housings: Galvanized steel with flanged inlet and outlet connections.
C. Wheel Assemblies: Cast or extruded aluminum with airfoil-shaped blades mounted on cast-iron wheel plate keyed to shaft with solid-steel key.
D. Wheel Assemblies: Cast aluminum, machined and fitted to shaft.
E. Belt Drives:

1. Factory mounted, with adjustable alignment and belt tensioning.
2. Service Factor Based on Fan Motor Size: 1.2.
3. Fan Shaft: Turned, ground, and polished steel designed to operate at no more than 70 percent of first critical speed at top of fan's speed range.
4. Fan Pulleys: Cast iron with split, tapered bushing; dynamically balanced at factory
5. Motor Pulleys: Adjustable pitch for use with motors through 5 hp; fixed pitch for use with larger motors. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
6. Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.
7. Belt Guards: Fabricate of steel for motors mounted on outside of fan cabinet.
8. Motor Mount: Adjustable base.
9. Shaft Bearings: Radial, self-aligning bearings.

F. Accessories:

1. Companion Flanges: Rolled flanges of same material as housing.
2. Inspection Door: Bolted door allowing limited access to internal parts of fan, of same material as housing.
3. Propeller Access Section Door: Short duct section bolted to fan inlet and/or outlet allowing access to internal parts of fan for inspection and cleaning, of same material as housing.
4. Swingout Construction: Assembly allowing entire fan section to swing out from duct for cleaning and servicing, of same material as housing.
5. Mounting Clips: Horizontal ceiling or Vertical mounting clips welded to fan housing, of same material as housing.
6. Horizontal Support: Pair of supports bolted to fan housing, of same material as housing.
7. Vertical Support: Short duct section with welded brackets bolted to fan housing, of same material as housing.
8. Inlet Screen: Wire-mesh screen on fans not connected to ductwork, of same material as housing.
9. Outlet Screen: Wire-mesh screen on fans not connected to ductwork, of same material as housing.

10. Backdraft Dampers: Butterfly style, for bolting to the discharge of fan or outlet cone, of same material as housing.
11. Shaft Seal: Elastomeric seal and Teflon wear plate, suitable for up to 300 deg F (149 deg C).
12. Motor Cover: Cover with side vents to dissipate motor heat, of same material as housing.
13. Inlet Vanes: Adjustable; with peripheral control linkage operated from outside of airstream, bronze sleeve bearings on each end of vane support, and provision for manual or automatic operation of same material as housing.
14. Inlet Bell: Curved inlet for when fan is not attached to duct, of same material as housing.
15. Inlet Cone: Round-to-round transition of same material as housing.
16. Outlet Cone: Round-to-round transition, of same material as housing.
17. Stack Cap: Vertical discharge assembly with backdraft dampers, of same material as housing.
18. Direct-Driven Units: Encase motor in housing outside of airstream, factory wired to disconnect switch located on outside of fan housing. Extend lubrication lines to outside of casing and terminate with grease fittings. I.

Factory Finishes:

1. Sheet Metal Parts: Prime coat before final assembly.
2. Exterior Surfaces: Baked-enamel finish coat after assembly.
3. Coatings: Hot-dip galvanized or Powder-baked enamel.

- Apply to finished housings.
- Apply to fan wheels.

15.4.24VANEAXIAL FANS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or a comparable product by one of the following:

1. Acme Engineering & Mfg. Corp.
2. Aerovent; a Twin City Fan company.
3. Airmaster Fan Company.
4. American Coolair Corporation.
5. American Fan Company; part of Flakt Woods Americas.
6. Breidert Air Products.
7. Carnes Company.
8. Chicago Blower Corporation.

9. Cincinnati Fan.
10. CML Northern Blower Inc.
11. Greenheck Fan Corporation.
12. Hartzell Fan Incorporated.
13. Howden Buffalo Inc.
14. Howden Buffalo Inc.; New Philadelphia Division.
15. Lau Industries.
16. Loren Cook Company.
17. Madison Manufacturing.
18. New York Blower Company (The).
19. PennBarry.
20. Strobic Air Corporation.
21. Trane Inc.; a subsidiary of Ingersoll-Rand company.
22. Other approved & UL listed manufacturer.

C. Description: Fan wheel and housing, straightening vane section, factory-mounted motor with belt drive or direct drive, an inlet cone section, and accessories.

1. Variable-Pitch Fans: Internally mounted electric actuator, externally-mounted positive positioner, and mechanical-blade-pitch indicator. D. Housings: Galvanized steel.

1. Inlet and Outlet Connections: Flanges.
2. Guide Vane Section: Integral guide vanes downstream from fan wheel designed to straighten airflow.

D. Wheel Assemblies: Cast aluminum with airfoil-shaped blades mounted on cast-iron wheel plate keyed to shaft with solid-steel key.

E. Wheel Assemblies: Cast-aluminum hub assembly, machined and fitted with threaded bearing wells to receive blade-bearing assemblies with replaceable, cast-aluminum blades; factory mounted and balanced.

E. Belt Drives: Factory mounted, with final alignment and belt adjustment made after installation.

1. Service Factor Based on Fan Motor Size: 1.2.
2. Fan Shaft: Turned, ground, and polished steel designed to operate at no more than 70 percent of first critical speed at top of fan's speed range.
3. Fan Pulleys: Cast iron with split, tapered bushing; dynamically balanced at factory.
4. Motor Pulleys: Adjustable pitch for use with motors through 5 hp; fixed pitch for use with larger motors. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.

5. Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.
6. Belt Guards: Fabricate of steel for motors mounted on outside of fan cabinet.
7. Motor Mount: Adjustable base.
8. Shaft Bearings: Radial, self-aligning bearings. H. Accessories:

1. Companion Flanges: Rolled flanges of same material as housing.
2. Inspection Door: Bolted door allowing limited access to internal parts of fan, of same material as housing.
3. Propeller Access Section Door: Short duct section bolted to fan [inlet] [and] [outlet] allowing access to internal parts of fan for inspection and cleaning, of same material as housing.
4. Swingout Construction: Assembly allowing entire fan section to swing out from duct for cleaning and servicing, of same material as housing.
5. Mounting Clips: Horizontal ceiling clips welded to fan housing, of same material as housing.
6. Horizontal Support: Pair of supports bolted to fan housing, of same material as housing.
7. Vertical Support: Short duct section with welded brackets bolted to fan housing, of same material as housing.
8. Inlet Screen: Wire-mesh screen on fans not connected to ductwork, of same material as housing.
9. Outlet Screen: Wire-mesh screen on fans not connected to ductwork, of same material as housing.
10. Backdraft Dampers: Butterfly style, for mounting with flexible connection to the discharge of fan or direct mounted to the discharge diffuser section, of same material as housing.
11. Stall Alarm Probe: Sensing probe capable of detecting fan operation in stall and signaling control devices.
12. Flow Measurement Port: Pressure measurement taps installed in the inlet of fan to detect and signal airflow readings to temperature-control systems.
13. Shaft Seal: Elastomeric seal and Teflon wear plate, suitable for up to 300 deg F (148 deg C).
14. Motor Cover: Cover with side vents to dissipate motor heat, of same material as housing.
15. Inlet Vanes: Adjustable; with peripheral control linkage operated from outside of airstream, bronze sleeve bearings on each end of vane support, and provision for manual or automatic operation, of same material as housing.
16. Inlet Bell: Curved inlet for when fan is not attached to duct, of same material as housing.
17. Inlet Cone: Round-to-round transition, of same material as housing.
18. Outlet Cone: Round-to-round transition, of same material as housing.
19. Stack Cap: Vertical discharge assembly with backdraft dampers, of same material as housing.

20. Direct-Driven Units: Encase motor in housing outside of airstream, factory wired to disconnect switch located on outside of fan housing]. Extend lubrication lines to outside of casing and terminate with grease fittings.

15.4.25SOURCE QUALITY CONTROL

A. Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.

PART 3 - EXECUTION

15.4.26INSTALLATION

A. Install axial fans level and plumb.

B. Disassemble and reassemble units, as required for moving to the final location, according to manufacturer's written instructions.

C. Lift and support units with manufacturer's designated lifting or supporting points.

E. Install units with clearances for service and maintenance.

F. Label fans according.

15.4.27CONNECTIONS

A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors.

B. Connect wiring to panel board to include all necessary grounding works

15.5 VAV FRESH AIR INTO THE COURT YARD

FRESH AIR CASING AND DUCT WORK

PART 1 – GENERAL

15.5.1.SUMMARY

A. Section Includes:

1. Factory fabricated field-assembled insulated duct for fresh air.

1.3 PERFORMANCE REQUIREMENTS

A. Static-Pressure Classes:

1. Upstream from Fan(s): Refer to drawings.
2. Downstream from Fan(s): Refer to drawings.

B. Acoustical Performance:

1. NRC: Refer to drawings.
2. STC: Refer to drawings.

C. Structural Performance:

1. Casings shall be fabricated to withstand 133 percent of the indicated static pressure without structural failure. Wall and roof deflection at the indicated static pressure shall not exceed 0.97 mm per meter of width.

a.Fabricate outdoor casings to withstand wind load of 1000 N/sq. m.

15.5.2.ACTION SUBMITTALS

A.Product Data: For each type of the following products:

1. Factory-fabricated casings.
2. Liners and adhesives.
3. Sealants and gaskets.
4. Seismic-restraint devices.

15.5.3.INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

15.5.4.QUALITY ASSURANCE

C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up" or other equivalent.

D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation" or other equivalent.

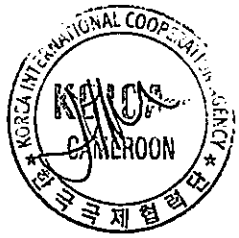
1.7 COORDINATION

1. Factory fabricated field-assembled insulated duct for fresh air.

1.3 PERFORMANCE REQUIREMENTS

A. Static-Pressure Classes:

1. Upstream from Fan(s): Refer to drawings.
2. Downstream from Fan(s): Refer to drawings.



B. Acoustical Performance:

1. NRC: Refer to drawings.
2. STC: Refer to drawings.

C. Structural Performance:

1. Casings shall be fabricated to withstand 133 percent of the indicated static pressure without structural failure. Wall and roof deflection at the indicated static pressure shall not exceed 0.97 mm per meter of width.

   a.Fabricate outdoor casings to withstand wind load of 1000 N/sq. m.

15.5.2.ACTION SUBMITTALS

A.Product Data: For each type of the following products:

1. Factory-fabricated casings.
2. Liners and adhesives.
3. Sealants and gaskets.
4. Seismic-restraint devices.

15.5.3.INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

15.5.4.QUALITY ASSURANCE

C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up" or other equivalent.

D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation" or other equivalent.

1.7 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchorbolt inserts into bases. Concrete, reinforcement, and formwork requirements

B. Coordinate sizes and locations of steel supports. Supports

C. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

PART 2 - PRODUCTS

15.5.5.GENERAL CASING FABRICATION REQUIREMENTS

A.General Material Requirements: Comply with SMACNA's "HVAC Duct Construction

Standards - Metal and Flexible," Chapter 9, "Equipment and Casings," for acceptable materials, material thicknesses, and casing construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

1. Fabricate casings with more than 750-Pa negative static pressure according to SMACNA's "Rectangular Industrial Duct Construction Standards."
2. Casings with more than 500-Pa positive static pressure may be fabricated according to SMACNA's "Rectangular Industrial Duct Construction Standards."

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M or shall comply according to other equivalent approved.

1. Exterior Surface Galvanized Coating Designation: G90 (Z275) 2. Interior Surface Galvanized Coating Designation:

a. Sections Not Exposed to Moisture: minimum G60 (Z180)

b. Sections Housing and Downstream from Cooling Coil and Humidifiers: G90 (Z275)

C. Sealing Requirement: SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Seal Class A. Seal all seams, joints, connections, and abutments to building.

D. Penetrations: Seal all penetrations airtight. Cover with escutcheons and gaskets, or fill with suitable compound so there is no exposed insulation.

E. Access Doors: Fabricate access doors according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 9-15, "Casing Access Doors 500 Pa," and Figure 9-16, "Casing Access Doors 750-2500 Pa"; and according to pressure class of the plenum or casing section in which access doors are to be installed or fabricate according to other equivalent approved standard. Hinges: Piano or butt hinges and latches, number and size according to SMACNA's

"HVAC Duct Construction Standards - Metal and Flexible."

1. Latches: Minimum of two wedge-lever-type latches, operable from inside and outside.
2. Neoprene gaskets around entire perimeters of door frames.
3. Doors shall open against air pressure.

F. Condensate Drain Pans: Formed sections of coated, galvanized sheet steel] complying with requirements in ASHRAE 62.1. Pans shall extend a minimum of 300 mm past coil.

1. Double-wall construction shall have space between walls filled with foam insulation and sealed moisture tight.
2. Intermediate drain pan or drain trough shall collect condensate from top coil for units with stacked coils or stacked eliminators.
3. Insulation: Polystyrene or polyurethane.
4. Slopes shall be in a minimum of two planes to collect condensate from cooling coils (including coil piping connections and return bends), eliminators, and humidifiers when units are operating at maximum catalogued face velocity across cooling coil.
5. Each drain pan connection shall have a trap.

15.5.6. MANUFACTURED CASINGS,

Refer to selected model specification too.

A.Description: Double/single wall equipment casing.

B. Double-Wall Panel Fabrication: Solid, galvanized sheet steel exterior wall and solid/ perforated, galvanized sheet steel interior wall; with space between walls filled with insulation.

1. Wall Thickness: 25/50 mm.
2. Fabricate with a minimum number of joints.
3. Weld exterior and interior walls to perimeter; to interior, longitudinal, galvanized-steel channels; and to box-end internal closures. Paint welds.
4. Sheet metal thickness shall comply with SMACNA's "HVAC Duct Construction

Standards - Metal and Flexible" for static-pressure class indicated for casing.

5. Sheet Metal Thicknesses:

   a. Exterior Wall Thickness: 1.0 mm minimum.
   b. Interior Wall Thickness: 0.85 mm minimum.

6. Double-Wall Casing Inner Panel: Perforated, galvanized sheet steel having 2.4mm diameter perforations, with overall open area of 10percent.
7. Double-Wall Casing Inner Panel: Solid sheet steel.
8. Fill each panel assembly with insulating material that is noncombustible, inert, mildew resistant and vermin proof and that complies with NFPA 90A.
9. Fabricate panels with continuous tongue-and-groove or self-locking joints effective inside and outside each panel.

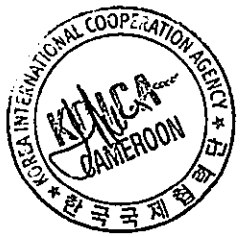
C. Trim Items: Fabricate from a minimum of 1.3mm galvanized sheet steel, furnished in standard lengths for field cutting.

15.5.7.CASING LINER

A. Fibrous-Glass Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B and with NAIMA AH124, "Fibrous Glass Duct Liner Standard" or shall be manufactured as per other approved equivalent standard.

1. Maximum Thermal Conductivity:

   a. Type I, Flexible: 0.039 W/m x K at 24 deg C mean temperature.
   b. Type II, Rigid: 0.033 W/m x K at 24 deg C mean temperature.



2. Antimicrobial Erosion-Resistant Coating: Apply to surface of the liner that will form the interior surface of casing to act as a moisture repellent and an erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
3. Solvent Water Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.

   a. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   b. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Flexible-Elastomeric Casing Liner: Preformed, cellular, closed-cell, sheet materials complying with ASTM C 534, Type II, Grade 1, and with NFPA 90A or NFPA 90B or other equivalent approved.

1. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
2. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.

    a. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
    b. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile
    Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Natural-Fiber Casing Liner: 85 percent cotton, 10 percent borate, and 5 percent polybinding fibers, treated with a microbial growth inhibitor, and complying with NFPA 90A or NFPA 90B.

1. Maximum Thermal Conductivity:0.034 W/m x K at 24 deg C mean temperature when tested according to ASTM C 518.
2. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
3. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.

    a. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
    b. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile

    Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Insulation Pins and Washers:
1. Insulation-Retaining Washers: Self-locking washers formed from 0.41-mm thick, [galvanized] [stainless] steel, with beveled edge sized as required to hold insulation securely in place but not less than 38 mm in diameter.

E. Shop or Factory Application of Casing Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."

1. Adhere a single layer of indicated thickness of casing liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of casing liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.
4. Fold and compress liner in corners of casings or cut and fit to ensure butted-edge overlapping.
5. Apply adhesive coating on longitudinal seams in casings with air velocity of 12.7 m/s.
6. Secure liner with mechanical fasteners 100 mm from corners and at intervals not exceeding 300 mm transversely; at 75 mm from transverse joints and at intervals not exceeding 450 mm longitudinally.
7. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from casing wall. Fabricate edge facings at the following locations:
   a. Fan discharges.
   b. Intervals of lined casing preceding unlined duct.
   c. Upstream edges of transverse joints in casings where air velocities are higher than 12.7 m/s or where indicated.
8. Secure insulation between perforated sheet metal inner wall of same thickness as specified for outer wall. Use mechanical fasteners that maintain inner wall at uniform distance from outer wall without compressing insulation.

15.5.8.SEALANT MATERIALS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.

7. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

PART 3 - EXECUTION

15.5.9.EXAMINATION

A. Examine concrete bases, roof curbs and steel supports for compliance with requirements for conditions affecting installation and performance of HVAC casings.

B. Examine casing insulation materials and liners before installation. Reject casings that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

15.5.10.INSTALLATION

A. Install casings according to SMACNA's "HVAC Duct Construction Standards - Metal and
Flexible."

B. Equipment Mounting:

1. Install HVAC casings on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-inPlace Concrete, Section 033053 "Miscellaneous Cast-in-Place Concrete."
2. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
3. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."

C. Apply sealant to joints, connections, and mountings.

D. Field-cut openings for pipe and conduit penetrations; insulate and seal according to SMACNA's
"HVAC Duct Construction Standards - Metal and Flexible."

E. Support casings on floor or foundation system. Secure and seal to base.

7. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

PART 3 - EXECUTION

15.5.9.EXAMINATION

A. Examine concrete bases, roof curbs and steel supports for compliance with requirements for conditions affecting installation and performance of HVAC casings.

B. Examine casing insulation materials and liners before installation. Reject casings that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

15.5.10.INSTALLATION

A. Install casings according to SMACNA's "HVAC Duct Construction Standards - Metal and
Flexible."

B. Equipment Mounting:

1. Install HVAC casings on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-inPlace Concrete, Section 033053 "Miscellaneous Cast-in-Place Concrete."
2. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
3. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."

C. Apply sealant to joints, connections, and mountings.

D. Field-cut openings for pipe and conduit penetrations; insulate and seal according to SMACNA's
"HVAC Duct Construction Standards - Metal and Flexible."

E. Support casings on floor or foundation system. Secure and seal to base.

F. Support components rigidly with ties, braces, brackets, seismic restraints and anchors of types that will maintain housing shape and prevent buckling.

G. Align casings accurately at connections, with 3-mm misalignment tolerance and with smooth interior surfaces.

15.5.11.FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Perform field tests and inspections according to SMACNA's "HVAC Air Duct Leakage Test Manual "or other equivalent approved manual.

2.Test the following systems:

a.Systems required by ASHRAE/IESNA 90.1or other approved equivalent

3. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If pressure classes are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.

3. Determine leakage from entire system or section of system by relating leakage to surface area of test section. Comply with requirements for leakage classification of ducts connected to casings.
4. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.

B. Casings will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

DIFFUSERS, REGISTERS AND GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rectangular and square ceiling diffuser.
2. Adjustable bar registers and grilles

PART 2 - PRODUCTS

15.5.12.CEILING DIFFUSERS

A.Rectangular and Square Ceiling Diffusers, refer equipment schedule on drawings.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. A-J Manufacturing Co., Inc.
    b. Anemostat Products; a Mestek company.
    c. Carnes.
    d. Hart & Cooley Inc.
    e. Krueger.
    f. METALAIRE, Inc.
    g. Nailor Industries Inc.
    h. Price Industries.
    i. Titus.
    j. Tuttle & Bailey.
    k. Other approved & UL listed manufacturer.
3. Material: Aluminum.
4. Finish: Extruded, color selected by Architect.
5. Face Size: 600 by 600 mm, 500 by 500 mm or 300 by 300 mm, See equipment schedule.
6. Face Style: four cones.
7. Mounting: Mounting panel or as per manufacturer recommendation.
8. Pattern: Adjustable.
9. Dampers: Combination damper and grid.
10. Accessories:

    a. Equalizing grid.
    b. Plaster ring.
    c. Safety chain.
    d. Wire guard.
    e. Sectorizing baffles.
    f. Operating rod extension.

15.5.13.REGISTERS AND GRILLES

A. Adjustable Bar Register, /Not included in this design, incase required though construction period/

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

   a. A-J Manufacturing Co., Inc.
   b. Anemostat Products; a Mestek company.
   c. Carnes.
   d. Dayus Register & Grille Inc.
   e. Hart & Cooley Inc.
   f. Krueger.
   g. METALAIRE, Inc.
   h. Nailor Industries Inc.
   i. Price Industries.
   j. Titus.
   k. Tuttle & Bailey.
   l. Other approved & UL listed manufacturer.

3. Material: Aluminum.
4. Finish: Extruded, color selected by Architect.
5. Face Blade Arrangement: Vertical spaced 76 mm, 38 mm,19 mm or 13 mm apart.
6. Core Construction: Removable.
7. Rear-Blade Arrangement: Horizontal 19 mm or 13 mm apart.
8. Frame: 32 mm wide.
9. Mounting Frame: Manufacturer size.
10. Mounting: Concealed.
11. Damper Type: Adjustable opposed blade.
12. Accessories:

    a. Front-blade gang operator.

B.Adjustable Bar Grille, refer equipment schedule on drawings.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

   a. A-J Manufacturing Co., Inc.
   b. Anemostat Products; a Mestek company.
   c. Carnes.
   d. Dayus Register & Grille Inc.
   e. Hart & Cooley Inc.
   f. Krueger.
   g. METALAIRE, Inc.
   h. Nailor Industries Inc.
   i. Price Industries.
   j. Titus.
   k. Tuttle & Bailey.
   l. Other approved & UL listed manufacturer.

3. Material: Aluminum.
4. Finish: Extruded, color selected by Architect.
5. Face Blade Arrangement: Vertical.
6. Core Construction: Removable.
7. Rear-Blade Arrangement: Horizontal.
8. Frame: 32 mm wide.
9. Mounting: Concealed.

15.5.14.SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70,

"Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.2 ADJUSTING

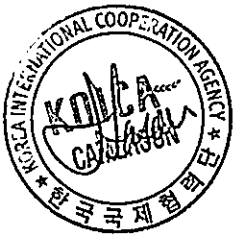
A. After installation, adjust diffusers and grilles to air patterns indicated, or as directed, before starting air balancing.

DIVISION 16: WASHING AND DRYING ROOM

16.1. SUMMARY

- Install a new 100 kg laundry machine
- Install new electric drier of 100 kg.

16.2. ELECTRIC, DOMESTIC-WATER HEATERS



PART 1 - GENERAL

16.2.1.SUMMARY

A. Section Includes:
   1. Domestic-water heater accessories.

16.2.2.PERFORMANCE REQUIREMENTS

A. Seismic Performance: Commercial domestic-water heaters shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

16.2.3.ACTION SUBMITTALS

A. Product Data: For each type and size of domestic-water heater indicated.

B. Retain first paragraph below and "ASHRAE/IESNA 90.1 Compliance" Paragraph in "Quality Assurance" Article if required for electric, domestic-water heaters.

C. Shop Drawings:

1.Wiring Diagrams: For power, signal, and control wiring.

16.2.4.INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Warranty: Sample of special warranty.

DIVISION 16: WASHING AND DRYING ROOM

16.1. SUMMARY

- Install a new 100 kg laundry machine
- Install new electric drier of 100 kg.

16.2. ELECTRIC, DOMESTIC-WATER HEATERS

PART I - GENERAL

16.2.1.SUMMARY

A. Section Includes:
   1. Domestic-water heater accessories.

16.2.2.PERFORMANCE REQUIREMENTS

A. Seismic Performance: Commercial domestic-water heaters shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

   1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

16.2.3.ACTION SUBMITTALS

A. Product Data: For each type and size of domestic-water heater indicated.

B. Retain first paragraph below and "ASHRAE/IESNA 90.1 Compliance" Paragraph in "Quality Assurance" Article if required for electric, domestic-water heaters.

C. Shop Drawings:

   1.Wiring Diagrams: For power, signal, and control wiring.

16.2.4.INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Warranty: Sample of special warranty.

16.2.5.CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

16.2.6.QUALITY ASSURANCE:

shall follow the followings or other equivalent approved standards.

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

C. ASME Compliance: Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61, "Drinking Water System Components - Health Effects."

16.2.7.WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.

1.Warranty Periods: One year from date of Substantial Completion.

PART 2 - PRODUCTS: Shall comply the following or other equivalent approved standards.

16.2.8.COMMERCIAL, ELECTRIC WATER HEATERS

A.Commercial, Light-Duty, Storage, Electric, Domestic-Water Heaters:

1. Standard: UL 174.
2. Storage-Tank Construction: Steel, vertical arrangement.
   a. Tappings: ASME B1.20.1 pipe thread.
   b. Pressure Rating : 1035 kPa.
   c. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending lining material into tappings.

3.Factory-Installed Storage-Tank Appurtenances:

a. Anode Rod: Replaceable magnesium.
b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
c. Drain Valve: ASSE 1005.
d. Insulation: Comply with ASHRAE/IESNA 90.1or ASHRAE 90.2.
e. Jacket: Steel with enameled finish.
f. Heat-Trap Fittings: Inlet type in cold-water inlet and outlet type in hot-water outlet.
g. Heating Elements: Two; electric, screw-in immersion type; wired for simultaneous operation unless otherwise indicated. Limited to 12 kW total.
h. Temperature Control: Adjustable thermostat.
i. Safety Control: High-temperature-limit cutoff device or system.
j. Relief Valve: ASME rated and stamped for combination temperature-and-pressure relief valves. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valve with sensing element that extends into storage tank.

4. Special Requirements: NSF 5 construction with legs for off-floor installation. B. Capacity and Characteristics:

1. Capacity: 200l.
2. Recovery: at 28 deg c temperature rise.
3. Temperature Setting: 60 deg C
4. Power Demand: See manufacturer data Heating Elements:

a. Number of Elements: Two-Three
b. Kilowatts Each Element:
c. Number of Stages: One

5. Electrical Characteristics:

a. Volts: 220
b. Phases: Single or Three
c. Hertz: 50.
d. Full-Load Amperes:
e. Minimum Circuit Ampacity:
f. Maxi
g. mum Over Current Protection:

16.2.9.SOURCE QUALITY CONTROL:

Shall be per the following or other equivalent approved standards.

A. Factory Tests: Test and inspect domestic-water heaters specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.

B. Hydrostatically test commercial-water heaters to minimum of one and one-half times pressure rating before shipment.

C. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

16.2.10. WATER HEATER INSTALLATION

A. Commercial, Electric, Domestic-Water Heater Mounting: Install commercial, electric-water heaters on concrete base. Comply with related requirements for concrete bases specified in structural technical specification.

1. Exception: Omit concrete bases for commercial, electric, domestic-water heaters if installation on stand, bracket, suspended platform, or directly on floor is indicated.
2. Maintain manufacturer's recommended clearances.
3. Arrange units so controls and devices that require servicing are accessible.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 450-mm centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
6. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
7. Install anchor bolts to elevations required for proper attachment to supported equipment.
8. Anchor domestic-water heaters to substrate.

B. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

C. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for electric, domestic-water heaters that do not have tank drains.

D. Install thermometers on outlet piping of electric, domestic-water heaters.

E. Fill electric water heaters with water.

16.2.11. CONNECTIONS

A. Where installing piping adjacent to electric, water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

16.2.12. FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Prepare test and inspection reports.

16.3. COMERCIAL LAUNDRY MACHINE

PART 1 - GENERAL

16.3.1.SUMMARY

Section Includes:

2. Comercial laundry machine.

16.3.2.PERFORMANCE REQUIREMENTS

A. Seismic Performance: Commercial washing machine shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

16.3.3.ACTION SUBMITTALS

D. Product Data: For each type and size washing machine indicated.

E. Shop Drawings:

1.Wiring Diagrams: For power, signal, and control wiring.

16.3.4.INFORMATIONAL SUBMITTALS

C. Field quality-control reports.

D. Warranty: Sample of special warranty.

16.3.5.CLOSEOUT SUBMITTALS

B. Operation and maintenance data.

16.3.6.QUALITY ASSURANCE:

shall follow the followings or other equivalent approved standards: US Sic Code 3582

16.3.7.WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.

1.Warranty Periods: One year from date of Substantial Completion.

PART 2 - PRODUCTS: Shall comply the following or other equivalent approved standards.

16.3.8.COMMERCIAL WASHING MACHINE

A.Commercial washing machine:

Special Requirements: NSF 5 construction with legs for off-floor installation.

B. Capacity and Characteristics:

5. Capacity: 100kg.
6. Drum volume: 180l
7. Minimum spin speed 1.075rpm
8. Residual moisture in %: 460/44
9. Cycle time not more than 50 minutes

10. Power Demand: See manufacturer data:

5. Electrical Characteristics:

   h. Volts: 220 or 380
   i. Phases: Single or Three
   j. Hertz: 50.
   k. Full-Load Amperes:
   l. Minimum Circuit Ampacity:
   m. Maximum Over Current Protection:

16.3.9.SOURCE QUALITY CONTROL:

Shall be per the following or other equivalent approved standards.

E. Factory Tests: Comply to requirements of US SIC Code 3582

F. Hydrostatically test commercial-water heaters to minimum of one and one-half times pressure rating before shipment.

G. Electric, commercial washing machine will be considered defective if they do not pass tests and inspections.

H. Prepare test and inspection reports.

PART 3 - EXECUTION

16.3.10. COMMERCIAL LAUNDRY MACHINE

A. Install commercial, electric-water heaters on concrete base. Comply with related requirements for concrete bases specified in structural technical specification.

- Maintain manufacturer's recommended clearances.
- Arrange units so controls and devices that require servicing are accessible.
- Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 450-mm centers around the full perimeter of concrete base.
- For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
- Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
- Install anchor bolts to elevations required for proper attachment to supported equipment.
- Anchor domestic-water heaters to substrate.

B. Install combination temperature-and-pressure relief valves in top portion of drum. Use relief valves with sensing elements that extend into tanks.

C. Install all necessary drain pipings.

16.3.11. CONNECTIONS

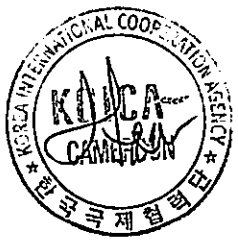
B. Where installing piping adjacent to commercial laundy machine, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

16.3.12. FIELD QUALITY CONTROL

A. Perform tests and inspections.

4. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
5. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
6. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Prepare test and inspection reports.



DIVISION 17: RESUSCITATION

17.1. SUMMARY

- Excavation and placing of a new pipe of 125 as shown on plans
- Change floor drain
- Install exhaust extractor fans as shown on plans and cable.

17.2. ACTION SUBMITTALS

A. Product Data: For each type and size washing machine indicated.
B. Samples

17.3. INFORMATIONAL SUBMITTALS

A. Field quality-control reports.
B. Warranty: Sample of special warranty.

17.4. CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

17.5. PIPING

A. Comply with section 1.2.6 of the present SPECS.

17.6. EXHAUST EXTRACTOR FANS

A. Comply with section 15.4 of the present SPECS.

DIVISION 18: SHADOW LESS OPERATION LAMPS

18.1. SUMMARY

Replace blown lamps only with 3 Cartons of lam

18.2. PERFORMANCE REQUIREMENTS

A. Seismic Performance: Operation lamps shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

18.3. ACTION SUBMITTALS

F. Product Data: For each type and size.

G. Shop Drawings:

18.4. INFORMATIONAL SUBMITTALS

E. Field quality-control reports.

F. Warranty: Sample of special warranty.

18.5. CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

18.6. SHADOWLESS OPERATION LAMP

- Kind: LED Surgical Lamp
- Type: Operation Light
- Light Intensity 50000X
- Color Temperature: 3500K-5000K
- Color Rendering Index (CRI): 85-100
- Spot Diametre: To fit to current light
- Input Voltage 220V/50Hz

DIVISION 19: FIRE DETECTION SYSTEMS

19.1 SUMMARY

- Replace break glass call point
- Replacement of defective ceiling fire detector

19.2 DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- Section Includes:
  - Fire-alarm control unit.
  - Manual fire-alarm boxes.
  - System smoke detectors.
  - Heat detectors.
  - Addressable interface device.

19.3 ACTION SUBMITTALS

A. Product Data: For a new product that would be install. Characteristic of new product must be better than the one to be replaced.

B. Shop Drawings: For fire-alarm system.
   - Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
   - Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
   - Detail assembly and support requirements.
   - Include voltage drop calculations for notification-appliance circuits.
   - Include performance parameters and installation details for each detector.
   - Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.
   - Show field wiring required for VAV and AC systems would be shutdown on alarm.
   - Locate detectors according to manufacturer's written recommendations.
   - Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.

19.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.
B. Field quality-control reports.
C. Sample warranty.

19.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.

19.6 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

19.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment within specified warranty period one year

PART 2 - PRODUCTS

19.8 SYSTEM DESCRIPTION

A. Source Limitations for Fire-Alarm System and Components: Components shall be compatible with, and operate as an extension of, existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.

B. Non coded, UL-certified FM Global-placarded addressable system, with multiplexed signal transmission and horn/strobe evacuation.

19.9 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:Manual stations.
B. Fire-alarm signal shall initiate the following actions:
   i. Continuously operate alarm notification appliances.
   ii. Identify alarm and specific initiating device at fire-alarm control unit
   iii. Transmit an alarm signal to the remote alarm receiving station.
   iv. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
   v. Close smoke dampers in air ducts of designated air-conditioning duct systems.
   vi. Activate preaction system.
   vii. Recall elevators to primary or alternate recall floors.
   viii. Activate elevator power shunt trip.

ix. Activate emergency lighting control.
x. Record events in the system memory.

19.10 MANUAL FIRE-ALARM TO BE REPLACED

C. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38.
   i. Single-action mechanism, breaking-glass or plastic-rod type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
   ii. Station Reset: Key- or wrench-operated switch.

19.11 NOTIFICATION APPLIANCES

B. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.

PART 3 - EXECUTION

19.12 EQUIPMENT INSTALLATION

A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."
B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
C. Equipment Mounting: Install fire-alarm control unit on finished floor.
D. Install manual fire-alarm box in the normal path of egress within 60 inches (1520 mm) of the exit doorway.
E. Mount manual fire-alarm box on a background of a contrasting color.
F. The operable part of manual fire-alarm box shall be between 42 inches (1060 mm) and 48 inches (1220 mm) above floor level. All devices shall be mounted at the same height unless otherwise indicated.
G. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.
H. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling. Install all devices at the same height unless otherwise indicated.
I. Device Location-Indicating Lights: Locate in public space near the device they monitor.

19.13 CONNECTIONS

A. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.
B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 36 inches (910 mm) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
    i. Electronically locked doors and access gates.
    ii. Alarm-initiating connection to elevator recall system and components.
    iii. Alarm-initiating connection to activate emergency lighting control.

19.14 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.
B. Ground shielded cables at the control panel location only. Insulate shield at device location.

DIVISION 20: TELECOMMUNICATION AND SPEAKER POINT

20.1 SUMMARY

- Change all defective broadcasting speaker system
- Change defective interphone
- Wire to loop broadcasting system to fire system for automatic call

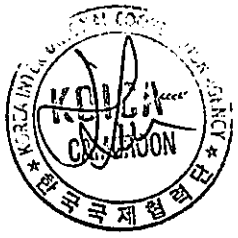
20.2 PRODUCT AND EXECURTION

A. Refer to Division 19

DIVISION 21: EQUIPMENT REPAIR AND INSTALLATION WORKS

21.1 SUMMARY

- Change battery and fuse for City Scan
- Repair UPS for scan
- Install New AVR for x-ray and others for a stable power supply
- Install new UPS for elevator and Carry out maintenance work on elevator
- Emergency Generator; repair battery, oil filter, fuel filter, air filter, coolant etc.



DIVISION 22: EXTERNAL LAUNDRY

22.1 SUMMARY

- Demolish external laundry at the space for the construction of Waiting Area
- Construct new external drawing according to designs between the external toilet wall and the gas station wall.

[Section 3] Bidding Forms (Separately attached)

Annex 1: Bid application form

Annex 2: Bidder's Information Sheet

Annex 3: Form of Bid

Annex 4: Experience Form (Construction Experience)

Annex 5: Financial Data Form (Financial Situation)

Annex 6: Declaration of Anti-Corruption in ODA Business Participation

Annex 7: Integrity Pledge

Annex 8: Bid Security

Annex 9: JV Agreement

Annex 1: Bid application form

Bid Application Form

Invitation No.			
Bid Title			
Legal name		Taxpayer ID	
Name of CEO			
Legal Address, City, Country		Telephone	
		Fax	
Website		E-mail	
Country of constitution		Year of constitution	
Authorized representative	Job Title	Name	Signature or Seal
Required Documents	○ Latest/valid Certificate of business Registration ○ documents evidencing the authenticity of the applicant's signature or seal power of attorney		

I, as a legally authorized representative of the Firm, duly state that all of the above information is true and correct and hereby duly apply for registration.

1. Documents to be submitted must be issued or authenticated by Government Agency or authority concerned of the Applicant's country, otherwise these documents must be certified by the notary public.
2. This application form must be filled out in English. When the original documents are in a language other than English, they must be accompanied by a duly notarized English translation.

Date _____

(Company Name)

Signature or Seal _____

Representative

_____ _____

To. President of KOICA (Country Director of KOICA Nepal Office)

Annex 2: Bidder's Information Sheet

Bidder's Information Sheet

Bidder's Information Sheet

Bidder's Information	
Bidder's legal name	
In case of JV, legal name of each partner	
Bidder's country of constitution	
Bidder's year of constitution	
Bidder's legal address in country of constitution	
Bidder's authorized representative information (name, address, telephone numbers, e-mail address)	
Attached are copies of the following original documents. ◦ ◦ ◦	

Date _____

(Company Name) Signature or Seal _____

Representative

_____ _____

KOREA INTERNATIONAL COOPERATION AGENCY * 한국국제협력단 *

JV Information Sheet (Each member of a JV must fill in this form)

JV Information	
Bidder's legal name	
JV partner's legal name	
JV partner's country of constitution	
JV partner's year of constitution	
JV partner's legal address in country of constitution	
JV partner's authorized representative information (name, address, telephone numbers, e-mail address)	
Attached are copies of the following original documents. ◦ ◦ ◦	

Annex 3: Form of Bid

Form of Bid			
Invitation No.		Date of Bid	
Bid Title			
Bid Amount	[numbers]		
	[words]		
Duration			

Details of the Bidder

Section	Legal name	Legal Address, City, Country	Representative
Bidder			
JV partner			
JV partner			

We submit the Bid to participate in a bid in accordance with Bid Documents including Bid Instructions under International Procurement Guideline and Instructions on the International Bidding for the Procurement of Construction Works. And if the bid is accepted by KOICA, we definitely promise that we should perform the contract in conformity with all conditions of the contract within contract period with the amount.

Attachment: a letter of attorney (entrust matters relating to a bid to Representative Company thereby)

Date _____

(Company Name)

Signature or Seal _____

Representative

_____ _____

To. President of KOICA (Country Director of KOICA Nepal Office)

Annex 4: Experience Form (Construction Experience)
[Form EXP 1]

General Construction Experience

Each Bidder (or member of a JV) must fill in this form

General Construction Experience				
Starting Month Year	Ending Month Year	Years	Contract Identification and Name Name and Address of Employer Brief Description of the Works Executed by the Bidder	Role of Bidder
				contractor/ subcontractor/ management contractor

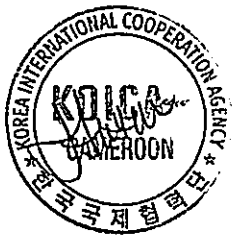
[Form EXP 2]

Specific Construction Experience

Fill up one (1) form per contract.

Contract of Similar Size and Nature			
Contract No ~ of ~	Contract Identification		
Award Date		Completion Date	
Role in Contract	□ Contractor	□ Management Contractor	□ Subcontractor
Total Contract Amount	USD		
If partner in a JV or subcontractor, specify participation of total contract amount	Percent of Total	Amount	
Employer's Name Address Telephone Number Fax Number E-mail			
Description of the similarity			

[Form EXP 3]



Proposal Personnel

Bidders should provide the names of suitably qualified personnel to meet the requirements specified in Evaluation and Qualification Criteria. The data on their experience should be supplied using the Form below for each candidate.

1.	Title of position*
	Name
2.	Title of position*
	Name
3.	Title of position*
	Name
4.	Title of position*
	Name
5.	Title of position*
	Name
6.	Title of position*
	Name
7.	Title of position*
	Name
8.	Title of position*
	Name
etc.	Title of position*
	Name

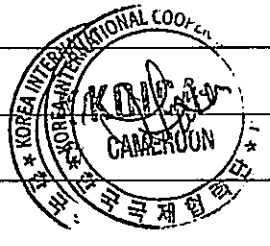
*As listed in Evaluation and Qualification Criteria.

Resume of Proposed Personnel

Position		
Personnel information	Name	Date of birth
	Professional qualifications	
Present employment	Name of employer	
	Address of employer	
	Telephone	Contact (manager/personnel officer)
	Fax	E-mail
	Job title	Years with present employer

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

From	To	Company/Project/Position/Relevant technical and management experience



Annex 5: Financial Data Form (Financial Situation)
[Form FIN 1]

Financial Situation (Historical Financial Performance)

Each Bidder (or member of a JV) must fill in this form

Financial Data for Previous 3 Years [USD Equivalent]		
Year 1:	Year 2:	Year 3:

Information from Balance Sheet

Total Assets*			
Total Liabilities			
Net Equity			
Current Assets			
Current Liabilities			

* Total Assets = Net Equity + Total Liabilities

Information from Income Statement

Total Revenues			
Profits Before Taxes			
Profits After Taxes			

- The Bidders shall submit copies of the audited financial statements (or balance sheets, including all related notes, and income statements) for the financial years 2019, 2020 and 2021 complying with the following conditions:
  - Must reflect the financial situation of the Bidder (or party to a JV), and not sister or parent companies.
  - Past financial statements must be audited by a certified public accountant.
  - Past financial statements must correspond to accounting periods already completed and audited. No statements for partial periods shall be accepted.

[Form FIN 2]

Average Annual Construction Turnover

Each Bidder (or member of a JV) must fill in this form

The information supplied should be the Annual Turnover of the Bidder (or each member of a JV) in terms of the amounts billed to clients for each year for work in progress or completed, converted to US Dollars at the rate of exchange at the end of the period reported.

Annual Turnover Data for the Last 3 Years (Construction only)			
Year	Amount Currency	Exchange Rate	US$ Equivalent
		Average Annual Construction Turnover	

Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject contract or contracts as indicated in Evaluation and Qualification Criteria.

Financial Resources		
No	Source of financing	Amount (US$ equivalent)
1		
2		
3		

Annex 6: Declaration of Anti-Corruption in ODA Business Participation
To. President of KOICA (Country Director of KOICA Nepal Office)

Declaration of Anti-Corruption in ODA Business Participation

☐ Contract name:

Employees and agents of our company declare the following in relation to their participation in the project contract.

- The Following Conditions -

1. We will fully understand the "Act on Combating Bribery of Foreign Public Officials in International Business Transactions" (Law No. 15972, Dec. 18, 2018) and strictly adhere to the regulations regulated by the Act.

2. We have not been convicted of foreign bribery in any jurisdiction (within the last 5 years) and will not engage in such actions in the future.

3. We will not allow employees to engage in unfair practices such as collusion, and will not provide bribes (money, lavish entertainment, etc. (including unfair employment for relatives and others)) to KOICA relevant employees and foreign government officials.

4. We will have internal control regulations, a company code of ethics and a supervision system to implement integrity contracts and prevent corruption, and will work to enact policy that does not enact any penalties to Whistle blowers.

5. We pledge that we shall carry out consultant contracts/procurement contracts/construction contracts with the utmost of good faith, and not engage in irresponsible misconduct such as nonfulfillment of a contract without proper reasoning or fraudulent claims.

6. In the event that our company engages in any activity falling under the malpractice category set out below, or is under sanctions imposed by KOICA, we declare not to raise any objections to KOICA's measures with regard to such activity, including the prohibition of participation in projects by KOICA for up to two years.

   a. False Statements on Contract-related Documents
   b. Negligent Operations
   c. Improper Subcontracting
   d. Poor Survey and Design Services/Feasibility Studies

e. Breach of Contract
f. Damage or Injury to the Public
g. Damage or Injury to a Person Involved in the Operations
h. Bribery
i. Bid Rigging
j. Interference in Bidding and Contract Conclusion
k. Wrongful or Dishonest Acts

7. We pledge to comply with relevant ILO (International Labor Organization) Standards and KOICA's Commitment to Human Rights Management in the process of contract execution.

8. We pledge to uphold social values including job creation, equal opportunity with social integration, cooperation for co-prosperity and ethical management, and to endeavor to realize those values in the process of contract execution

Date _____

(Company Name) Signature or Seal _____

Representative

_____ _____

Annex 7: Integrity Pledge

Integrity Pledge

In participating in any bids/contracts for construction, goods and/or services invited/ordered by KOICA, the Company/I (i.e., the representative director/agent), the undersigned, and its executives and/or employees, and its subcontractors and their executives and employees (including those who, either directly or indirectly, carry out business with the subcontractors), do hereby undertake the following pursuant to Article 5-2 (Integrity Agreement) of the Act on Contracts to which the State is A Party, with deep understanding that "corruption-free and transparent corporate management and fair administration" is the key to the development of society and national competitiveness, and in recognition of stricter enforcement of the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions and sanctions against corrupt companies and nations:

1. The Company/I will not engage in any unfair trade practices which unjustly impede free competition in bidding (contracting) through engaging in any collusion, arrangement, resolution, or agreement with other companies with the intent to maintain the bid price or award the bid to a certain person.
   - If the Company/I violate(s) the foregoing, the Company/I will not raise any objection against the restriction on participating in bidding to the Company/me as the bidder who engages in unfair trade practices in accordance with the Enforcement Decree of the Act on Contracts to which the State is A Party, and if it is found that the Company/I has/have been engaging in unfair trade practices such as forming a cartel, the Company/I will not raise any objection to KOICA's complaint submitted to the Korea Fair Trade Commission (KFTC) and subsequent administrative fines imposed by KFTC.

2. The Company/I will not, directly or indirectly, offer any unfair profits such as money and valuables and/or entertainment, etc. (including illegal offering of a job position to relatives, etc.) to the related executives, employees, etc. in the procedures of bidding, winning a bid, contract execution and performing the terms of the contract (including after the construction completion).
   - If it is found that the Company/I has/have been favored in bidding and consequently entered into the contract through provision of money and valuables and/or entertainment, etc. (including illegal offering of a job position to relatives, etc.) to the related executives and employees in connection with bidding, and execution and/or performance of the contract in breach of the above, or to have received accommodation and, as a result, poorly carried out construction or manufacture during the procedures of performance of a contract, the Company/I will receive the restriction on bid participation as the bidder who engages in unfair trade practices in accordance with the Enforcement Decree of the Act on Contracts to

which the State is A Party.

- If it is found that the Company/I has/have provided money and valuables and/or entertainment, etc.(including illegal offering of a job position to relatives, etc.) to the related executives and employees for the purpose of making the bidding and contract terms favorable to the bidder and/or bid-winner (i.e., the contractor) or making the performance of the contract be of bad quality, the Company/I will receive the restriction on bid participation as the bidder who engages in unfair trade practices in accordance with the Enforcement Decree of the Act on Contracts to which the State is A Party.
- If it is found that the Company/I has/have provided money and valuables and/or entertainment, etc. (including illegal offering of a job position to relatives, etc.) to the related executives and employees in connection with bidding, and execution and/or performance of the contract, the Company/I will receive the restriction on bid participation as the bidder who engages in unfair trade practices in accordance with the Enforcement Decree of the Act on Contracts to which the State is A Party.

3. If it is found that the Company/I has/have provided money and valuables and/or entertainment, etc. (including illegal offering of a job position to relatives, etc.) to the related executives and employees in connection with bidding, winning a bid, and execution and/or performance of the contract, the Company/I will accept the cancellation of the decision to designate the successful bidder (if it is before execution of the contract), the cancellation of the contract (if it is before performance of the contract), and the termination/rescission of the contract in whole or in part (including compensation for any damages caused thereby) (if it is after the performance of the contract), and will not raise any objection, whether civil or criminal.

4. If the Company/I violate(s) Paragraph (1) 2 (Matters Related to the Prohibition of any Acts Impeding Fair Competition Such as Engaging in Prior Consultation Regarding the Bidding Price or Forming a Cartel for Awarding Bid to Certain Person) of Article 4-2 (Terms and Conditions of Integrity Agreement and Execution Procedure) of the Enforcement Decree of the Act on Contracts to which the State is A Party, it/I will pay for damages as follows:
   - Bidder: 5/100 of the bidding price; and
   - The Other Party to the Contract: 10/100 of the contract price

The Company/I hereby will undertake to comply with this Integrity Pledge at all costs as a pledge based on mutual trust; to perform the substance of this Integrity Pledge as it is as the special terms and conditions of the contract upon being selected as the winner (contractor); not to file any claim for damages against KOICA with respect to any measures taken by KOICA including restriction on bidding participation and/or termination of the contract; and not to raise any objection against KOICA, whether civil or criminal, with respect to any bidding from which the Company is excluded.

(Company Name)

Date _____

Signature or Seal _____

Representative

_____ _____

To. President of KOICA (Country Director of KOICA ~~Nepal~~ Cameroon Office)

Annex 8: Bid Security

Bid Security

Bank Guarantee

Invitation No:
Project Works:
Date of Bid:

We, the undersigned, hereby guarantee that, if awarded a contract, we will perform faithfully the requirements of the contract.

a. Should we withdraw our bid before its expiration and/or after being awarded by the Korea International Cooperation Agency (KOICA), or
b. Should we refuse to conclude the contract, or
c. Should we fail to establish a Contract Deposit in accordance with the contractual conditions,

We undertake to pay KOICA immediately an amount equivalent to five (5) percent of the total bid price, according to, and upon receipt of, its first written demand, without KOICA having to substantiate its demand.

We further guarantee that we will not claim against or appeal to KOICA in relation to any unfavorable action which may be taken against us by KOICA on the grounds that we have not complied with the above conditions.

Signed on _____, 2023

Contractor:		Guarantor:	
by	[Signature or Seal]	by	[Signature or Seal]
Name:		Name:	
Title:		Title:	

※ A different form of security is acceptable to KOICA only when it is substantially equivalent to the form and substance of the security established by KOICA herein.

Annex 9: JV Agreement

Joint Venture Agreement

To: President of KOICA (Country Director of KOICA Nepal Office)

The undersigned of this declaration of cooperation are by means of attached Powers of Attorney legally authorized to act with regard to [Name of the Project] and on behalf of their organizations.

They hereby declare:

1. that they will legalize a Joint Venture Agreement in case that a Contract for the [Name of the Project] is awarded to their group;
2. that they have nominated [Name of the lead partner] as the Sponsor Firm of the group for the purpose of the Bid;
3. that they authorized Mr./Ms. [Name of the person who is authorized to act as the Representative on behalf of the Joint Venture] to act as the Bidder's Representative in the name and on behalf of their group;
4. that all partners of the Joint Venture shall be liable jointly and severally for the execution of the Contract;
5. that this Joint Venture is an association constituted for the purpose of the execution of the [Name of the Project] under this Contract;
6. that if the Employer accepts the Bid of the Joint Venture, it shall not be modified in its composition or constitution until the completion of Contract without the prior consent of the Employer;
7. that each partner's share of the Work, stated as percentage of the total contract amount, shall be as follows:

Name of partner	Share of the Work (as percentage of the contract amount)
1. Lead Partner	50% or higher
2. Partner	10% or higher
3. Partner	10% or higher
Total	100

Give names and positions of the proposed Joint Venture Representatives, as well as organization's names and addresses:

1.	Name:	Signature:
	Position:	Date:
	Representative of: (Organization's Name)	

2.	Name:	Signature:
	Position:	Date:
	Representative of: (Organization's Name)	
3.	Name:	Signature:
	Position:	Date:
	Representative of: (Organization's Name)	

General Conditions of the Contract for International Construction Works

Article 1 – General Conditions

Article 1.1	**Definitions**	
(a)	In addition to any defined terms used elsewhere herein, the definitions in this Article shall apply throughout this Contract:	
이행보증	**"Bank Guarantee for Performance"**	means the guarantee provided pursuant to this Contract by the Contractor for the benefit of the Employer or KOICA to ensure the performance of its obligations under this Contract. The amount of the guarantee is set out in Section B of the Contract Agreement.
영업일	**"Business Day"**	means a day (other than Saturday, Sunday and a public holiday) on which banks (or government offices) are generally open in the Recipient Country.
산출내역서	**"Calculation Statement"**	means the Employer's Quantity Statement marked with details of the unit price and submitted by a bidder or the Contractor to the Employer before the submission of the notification of commencement of construction (the **"Notice of Commencement"**).
이행보증금	**"Cash Guarantee"**	has the meaning given in Article 4.2(a) hereof.
착공일	**"Commencement Date"**	means the date specified in Article 7.1 hereof.
준공일	**"Completion Date"**	means the date indicated as the completion date on the taking over certificate issued in accordance with Article 9.1 hereof; provided that if the issuance of the taking over certificate is delayed due to reasons attributable to the Employer, the Completion Date shall be deemed to be the date on which the completion inspection is completed in accordance with Article 8 hereof.
준공기한	**"Completion Deadline"**	means the date set out in paragraph 3 of Section B of this Contract, being the date by which the Contractor has agreed to complete the Construction Works under this Contract. Unless otherwise specified elsewhere herein, the Contract termination date specified in paragraph 3 of Section B of this Contract shall be the Completion Deadline.
공사시방서	**"Construction Specification"**	means a book containing technical details that are too difficult to set out or include in the design drawings, such as technical descriptions and related statements

		regarding materials, equipment, construction system, construction standards and construction techniques used for the Construction Works.
공사감독관	"Construction Supervisor"	means an employee, supervisor or construction project manager appointed by the Employer to perform the duties set out in Article 3.1 of these General Conditions.
공사	"Construction Works"	has the meaning given in Section A of Contract Agreement.
계약	"Contract"	has the meaning given in the preamble, and includes all of the contract documents listed in paragraph 6 of Section B of this Contract. Any citation of this Contract shall be deemed to refer to the relevant provisions of these General Conditions unless otherwise specified.
계약합의서	"Contract Agreement"	means the contract document signed by and between the parties.
계약기간	"Contract Period"	means the period specified in paragraph 3 of Section B of this Contract. Where paragraph 3 of Section B only specifies the completion deadline and does not separately specify the contract period, "Contract Period" shall be deemed to mean the period commencing on the Effective Date and ending on the date on which the Contractor fulfills all of its obligations under this Contract. The Contract Period may be amended by the mutual written agreement of the Employer and the Contractor or by the Employer providing written notice to the Contractor, without obtaining the prior consent of the government of the Recipient Country.
계약금액	"Contract Price"	means the amount set out in paragraph 1 of Section B of this Contract. Unless otherwise specified in the Special Conditions, the Contract Price shall be inclusive of all taxes and fees, including, but not limited to, VAT, commercial tax and duties.
계약상대자	"Contractor"	has the meaning given in the preamble and means a natural or legal person who has entered into this Contract on equal footing with the Employer.
계약상대자 제출문서	"Contractor Documents"	means all documents and materials (including in electronic form) submitted by the Contractor to the Employer in connection with and for the purposes of this Contract and includes, without limitation, drawings, sketches, maps, plans, photos, specifications, invoices, reports, computer software, databases, manuals, completion documents, models, 3D works relating to geography/topography/building, technical documents.
계약상대자 인력	"Contractor Personnel"	means the executives and employees of the Contractor and/or subcontractors, with whom the Contractor has, for the purposes of undertaking the Project, entered into

		an agreement, and their employees. Under no circumstances shall any "Contractor Personnel" be considered to be an employee or a branch of KOICA.
일(day)	"Day"	means a calendar day and in calculating a period, if the end date of such period does not fall on a Business Day, then the end date of such period shall be deemed to fall on the next Business Day.
하자통지기간	"Defect Notification Period"	means the period specified in the Detailed Terms and Conditions.
설계도면	"Design Drawing"	means a drawing or document indicating the nature and scope of the Construction to be constructed and the Construction Works to be undertaken and expressing the designer's intentions in accordance with established rules.
설계서	"Design Documents"	means collectively, the Construction Specification, the Design Drawing, the Site Manual and the Quantity Statement.
상세계약조건	"Detailed Terms and Conditions"	means the key terms of this Contract attached as a table to the Special Conditions.
발주자	"Employer"	has the meaning given in the preamble.
불가항력	"Force Majeure Event"	has the meaning given in Article 17.1 hereof.
계약일반조건	"General Conditions"	has the meaning given in paragraph 6.2 of Section B of this Contract.
	"Governmental Authorities"	means any legislative body, any administrative body, any judicial body of the Recipient Country, Korea or any other jurisdiction and any person who is authorised or has the power to act on behalf of any such authoritative body.
인허가	"Governmental Authorization"	means all authorizations, approvals, licenses, consents, permits issued by any Governmental Authority or any report, registration, filing made to any Governmental Authority.
법령	"Laws"	means the constitution, laws, regulations, orders, ordinances, rules, notices, guidelines and other requirements of the Recipient Country or Korea that are, at the relevant time, in effect and have the force of law.
당사자	"Party"	means individually, each of KOICA or the Employer and the Contractor and collectively, shall be the "Parties".
	"Performance Guarantee" or	means either the Bank Guarantee for Performance or the Cash Guarantee (as the case may be).

	"Contract Guarantee"	
사업	"Project"	has the meaning given in Section A of this Contract.
물량내역서	"Quantity Statement"	means a statement containing details of items or items of expenditure (including details of their specifications, quantity, units, etc.) that compose the object of each type of work, which statement is issued to a prospective bidder or a successful bidder after the announcement of a bid or the determination of a successful bidder.
현장	"Site" or "Construction Site"	means _____ being the location specified in Section B of this Contract. In the event the boundary or area of the Site is not detailed in Section B of this Contract, the boundary or area of the Site shall be determined in accordance with the details set out in the Site Manual.
현장설명서	"Site Manual"	means the manual provided by the Employer, which contains information (such as information regarding the Site conditions or instructions regarding unit prices) required to undertake the Construction Works.
계약특수조건	"Special Conditions"	has the meaning given in paragraph 6.3 of Section B of this Contract.
년(year)	"Year"	means 365 days or 366 days from January 1st to December 31st; provided that where a pertinent year has not been specified, it shall be 365 days for the purposes of *pro rata* calculations.

(b) Abbreviations or terms used in this Contract but not defined in the preceding paragraph shall be interpreted in accordance with international construction industry practice. However, if such term or abbreviation is not commonly used in international construction or multiple interpretations of such term or abbreviation are possible so as to cause a dispute between the Parties, such term or abbreviation shall be interpreted in accordance with KOICA's internal regulations or guidelines. If there is a disagreement on the interpretation of a term or abbreviation used in this Contract, the Contractor may request that the Employer provide KOICA's internal regulations or guidelines which form the basis of its interpretation.

Article 1.2 Interpretation

(a) Unless the context clearly requires otherwise, the following rules of interpretation shall apply to the terms used in this Contract:

(i) words denoting the singular shall include the plural, and vice versa;

(ii) whenever the words "include", "includes" and "including" are used, they shall be deemed to be followed by the words "without limitation";

(iii) when calculating a period, unless the period is to be calculated by time, it shall be deemed to be calculated from 0:00 the day following the day on which the relevant event occurred; provided that, when calculating

interest (including delayed interest), the day of occurrence shall be included in such calculation but the end date or deadline of the relevant period shall be excluded;

(iv) references to "agreement" in this Contract shall mean a written agreement signed by the authorised signatory or lawful agent of each Party;

(v) references to "written" or "in writing" or "documents" shall mean records that are handwritten, typed, printed or are in electronic form;

(vi) references to this Contract shall include all of its schedules, annexes and attachments; and

(vii) any reference to a statute or regulation shall be construed as including all regulations and rules promulgated thereunder and all provisions consolidating, amending or replacing such statute or regulation.

(b) References to a "person" shall be construed so as to include any individual, firm, company and other group or association.

(c) Any reference to standards or industrial standards and technology shall be construed as including any modifications or amendments thereto following the Effective Date unless otherwise specified herein.

Article 1.3 Notices

(a) Notices, applications, claims, requests, responses, approvals or instructions ("Notices") in the oral form shall not be effective unless supplemented in writing.

(b) Notices shall be delivered to the addresses specified in the Special Conditions and any change in the address details shall be notified to the other Party in writing, which written notice shall include the date of the change in address.

(c) Notices may be delivered in person, by post, through the Employer's e-procurement system, by email or fax (with confirmation of receipt) in accordance with the Special Conditions. Any changes to the recipient's notice details must be notified to the other Party immediately.

(d) Unless otherwise specified in the Special Conditions, Notices shall be effective as of the date on which they are received by each Party; provided that if the date of receipt is not a Business Day, then the Notice shall be effective as of the immediately following Business Day.

(e) Whenever it receives a legitimate request in writing, in accordance with the terms of this Contract, the Contractor shall exercise good faith in reviewing and responding to such request and its response must not be unreasonably delayed.

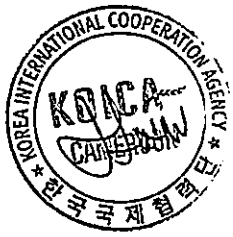
Article 1.4 Language

(a) The language of the Notices delivered in accordance with Article 1.3 and the documents specified in Article 1.5 hereof (collectively, the "Contract Documents") shall be, in principle, English; provided that where both the Korean language and the English language are used in parallel, the version in the Korean language shall prevail to the extent of any discrepancies.

(b) When necessary and with the approval of the Employer, another language ("Other Language") may be used in parallel with either Korean or English. Where such Other Language is used in parallel with the Korean language, the version in the Korean language shall prevail to the extent of any discrepancies and where the Other Language is used in parallel with the English language, the version in the English language shall prevail to the extent of any discrepancies.

Article 1.5 **Contract Documents**

(a) Each of the documents constituting this Contract have mutually complementary effect. The Contract Documents shall be applicable in the following order of priority; provided that if any conflict or inconsistency is found in any of the documents having the same priority or if in practice the matters described in a lower-ranking document clearly have priority notwithstanding the order of priority below, the Construction Supervisor shall provide the Contractor with the necessary instructions.



(i) the Contract Agreement;

(ii) the Special Conditions;

(iii) the General Conditions;

(iv) the Design Documents; and

(v) the Calculation Statement and other documents that form part of this Contract, such as the international construction project bidding notice, bid proposal and other tender documents; provided that the Calculation Statement shall be effective as a Contract Document only when it is applied for the purpose of adjusting the Contract Price and when making payments in respect of completed sections of the Construction.

(b) Notices delivered by the Parties in accordance with this Contract shall be effective as a Contract Document.

Article 1.6 **Assignment and Provision of Security**

(a) The Contractor shall not assign or provide security over this Contract or any of its rights (including but not limited to the right to claim payment of the Contract Price) or obligations arising under or in connection with this Contract to any third party without obtaining the prior written consent of the Employer.

(b) The Employer and/or KOICA shall be entitled to assign all or a part of their rights and obligations under this Contract or renew or update this Contract with prior written notice to the Contractor.

Article 1.7 **Management and Provision of Documents**

(a) The Design Documents (including the Construction Specification and Design Drawing) shall be maintained and managed by the Employer. Unless otherwise provided for in this Contract, the Employer shall provide the Contractor one (1) copy of the Contract Documents and the Design Documents within [15] days of the Effective Date. The Contractor shall be entitled to make additional copies or request additional copies from the Employer at its own cost and expense.

(b) The Contractor shall maintain and manage all documents that it is required to prepare or submit to the Employer in accordance with this Contract (the "**Contractor's Submitted Documents**") until such time the Employer accepts and takes over the Construction Works. Unless otherwise provided for in this Contract, the Contractor shall submit to the Construction Supervisor four (4) copies of all Contractor's Submitted Documents.

(c) The Contractor must maintain and store all documents, including without limitation, the Design Drawings and the Contract Documents received from the Employer, the booklets and documents cited in its bidding proposal, the Contractor's Submitted Documents, all Notices made and received pursuant this Contract at the Construction Site. The Construction Supervisor may, from time to time, request to view or receive copies of all documents kept by the Contractor at the Construction Site.

(d) The Employer may, if it deems it necessary, request to receive the documents, materials or information which form the basis for the Contractor's preparation of the Contract Documents (including without limitation the Calculation Statement), upon which request, the Contractor shall submit the same to the Employer within a reasonable period of time.

(e) If the Contractor becomes aware of any errors, omissions, defects or technical issues in the documents (including the Design Documents) required to undertake the Construction Works, it shall notify the Employer through the Construction Supervisor of the same within 30 days of receiving the relevant documents and the Construction Supervisor shall request from the Contractor the necessary explanation or, in accordance with Article 11.2 hereof, take measures to obtain from the Employer an opinion on whether a change to the details of the Construction Works is necessary. The Employer may, having taken into consideration the comments of the Construction Supervisor, request a change in the design in accordance with Article 11.2 hereof.

Article 1.8 **Confidentiality**

(a) All rights, including intellectual property rights, in, to and arising out of all materials, reports and other documents produced by the Contractor pursuant to this Contract shall, unless otherwise specified herein, vest in the Employer and the Contractor shall not provide them to a third party or use them for any other purpose without the prior consent of the Employer.

(b) The Contractor shall not disclose to any third party (including any outsider, government, the Recipient Country, governments of third countries) information, including without limitation, any trade secrets, confidential matters relating to Korea or the Recipient Country that it has obtained by virtue of this Contract (whether prior to or during the implementation of this Contract) without the prior written consent of the Employer. The Employer may, if required by the laws of Korea or if it otherwise deems necessary, disclose information relating to the tender for the Project and this Contract.

(c) The Contractor shall keep written records of all issues (including related countermeasures and improvement measures) that arise during its execution of the Construction Works and furnish such records at the Construction Site or at its place of business, and submit the same to the Employer at its request.

(d) The Contractor undertakes not to infringe any intellectual property rights (including any patent rights, trademark rights and design rights) of any third parties in fulfilling its obligations under this Contract.

(e) If the Contractor breaches paragraph (d) above and a dispute over intellectual property arises, the Contractor hereby agrees to indemnify and hold harmless, at its own cost and expense, the Employer, regardless of the cause of the dispute or claim.

(f) The provisions of this Article 1.8 shall remain valid and effective and survive any expiration, rescission of termination of this Contract.

Article 1.9 **Compliance with Laws**

(a) In undertaking the Construction Works, the Contractor shall comply with all applicable Laws of the Recipient Country and shall be solely liable for obtaining all related Governmental Authorizations at its own cost and expense. To the extent the Contractor has an office in Korea, the Contractor shall also be responsible for complying with all applicable Laws of Korea.

The Contractor shall comply with the Employer's standards and guidelines regarding the execution of the Construction Works and shall procure that all of its personnel (including its subcontractors) comply with the same. The Contractor shall be fully liable for any breach by it or its personnel (including its subcontractors) of the Employer's standards and guidelines.

Article 1.10 **Joint and Several Liability**

(a) If the Contractor is a union, consortium or an unincorporated association composed of two or more corporations or natural persons (each a "**Contractor Group**" and each member of Contractor Group being a "**Joint Contractor**"), each Joint Contractor shall be deemed to be jointly and severally liable to the Employer in respect of the Construction Works and the obligations of the Contractor under this Contract, unless the relevant Joint Contractor has separately agreed in writing with the Employer that it will be severally liable.

(b) Even if not otherwise provided for in this Contract, the Employer shall have the right to demand of any Joint Contractor or the Joint Contractors collectively that it or they fulfill the obligations of the Contractor under this Contract and to claim against any of them separately or jointly in case of a breach of any such obligations. However, if each Joint Contractor has separately agreed in writing with the Employer that it will be severally liable, such agreement shall prevail over the provisions of the preceding sentence.

(c) Any agreement or contract executed by and among the Joint Contractors shall be submitted to the Employer and such agreement or contract shall be a Contract Document for the purposes of this Contract.

(d) The Contractor shall not change (or allow the change of) the composition of a Contractor Group or the legal status of any Joint Contractor.

Article 1.11 Representations and Warranties

The Contractor hereby represents and warrants as follows:

(a) *Capacity.* It is duly organized and validly existing under the laws of its jurisdiction of incorporation and has full corporate power and is suitably qualified to undertake the Construction Works.

(b) *Governmental Authorizations.* It has duly obtained and maintains all Governmental Authorizations necessary to undertake the Construction Works.

(c) *Procedural Obligations.* It hereby covenants to undertake, in good faith, all procedures and processes (including but not limited to qualification screening, electronic procurement and obligations of integrity) required by the Employer in connection with the implementation of this Contract.

(d) *Guarantee.* It hereby guarantees the quality of the Construction Works and undertakes to repair any defects immediately in accordance with this Contract and the demands of the Employer. It further covenants not to raise any objections whatsoever in the event the Employer utilize the security deposit for defects because of the Contractor's failure to comply with the Employer's demands to repair defects.

(e) *Price Adequacy.* It hereby warrants that the Contract Price does not significantly exceed or fall below the normal market price.

(f) *Costs and Expenses.* It hereby confirms that the Contract Price is inclusive of all costs and expenses incurred by it outside of the Recipient Country in respect of the Construction Works (the "**Overseas Costs and Expenses**") and further undertakes that it will not, for any reason whatsoever, request that the Employer pays or reimburses it for any Overseas Costs and Expenses incurred. Notwithstanding the immediately preceding sentence, of the costs and expenses incurred by the Contractor in connection with the Construction Works, the Parties hereby agree that costs related safety management as set out in the Calculation Statement shall be settled *ex post* based on the actual amount expended by the Contractor (subject to the Contractor providing proof of expenditure). If the amount to be settled *ex post* is larger than the amount specified in the Calculation Statement, the Employer shall pay the excess amount to the Contractor.

(g) *Sovereign Immunity.* To the extent it is a government entity of the Recipient Country or a state-owned enterprise, it hereby represents and warrants that it waives any sovereign immunity.

Article 1.12 Covenants

The Contractor hereby covenants as follows:

(a) *Prohibition of Use of False, Deceptive or Other Unlawful Methods.* In undertaking the Construction Works, the Contractor covenants not to use false, deceptive or other unlawful methods. Unless otherwise specified in the Special Conditions, the Contractor shall submit a letter of undertaking to comply with integrity obligations (the "**Integrity Undertaking**") (in the form attached as Appendix 1 hereto) and hereby agrees to comply with the code of conduct and policies (the "**Code of Conduct**") attached to the Integrity Undertaking. The Contractor shall

not engage in any unfair acts, including but not limited to, collusion in the process of bidding, winning a bid, contract execution and implementation and shall not provide any bribes or entertainment treats (including offering special employment opportunities to relatives) to executives and employees of the Employer or any relevant public officials.

(b) *Subcontracts.* The Contractor shall not subcontract any part of this Contract or engage any third party subcontractor without the prior written consent of the Employer.

(c) *Assignment.* The Contractor shall not assign this Contract or any of its rights and obligations hereunder to any third party without the prior written consent of the Employer.

(d) *Tax and Duties.* Unless otherwise specified in the Special Conditions, the Contractor shall be solely liable for all taxes, duties and other similar imposts that arise in connection with this Contract.

(e) *Obligation to Report.* In the event of a situation or cause that may materially affect this Contract and the performance thereof, the Contractor shall immediately notify the Employer in writing.

Article 1.13 Severance and Waiver

(a) The provisions of this Contract shall be enforceable independently of each of the others and their validity shall not be affected if any of the others is deemed to be unenforceable, invalid or void.

(b) A waiver of any right provided by this Contract must be in writing. The Employer's omission to exercise or delay in exercising any right provided by this Contract shall not constitute a waiver of that or any other right. Unless otherwise specified in this Contract, the Employer shall be entitled to exercise all rights provided hereunder at any time without any restriction.

Article 2 – The Employer

Article 2.1 Delivery of the Site

(a) The Employer shall grant the Contract access to the Construction Site in accordance with this Contract and shall deliver the Construction Site to the Contractor within the period specified in the Special Conditions ("Site Delivery"). Notwithstanding the preceding sentence, where a phased or shared use of the Site is anticipated under this Contract, the Contractor's right to occupy or access the Construction Site may be restricted.

(b) Where the Employer has decided to deliver with the Site Delivery the structures, facilities and access roads within the Construction Site, the method and timing of their delivery shall be set out in the Detailed Terms and Conditions and the Construction Specifications.

(c) The Site Delivery shall be conditional upon the Contractor's provision of the Bank Guarantee for Performance.

(d) If the Employer fails to timely deliver the Site in breach of this Contract and as a result the Contractor is delayed and/or incurs additional costs and expenses, the Contractor shall be entitled to request an extension to the Completion Deadline in accordance with Article 18.1 hereof. However, if the Employer's delay in delivering the Site is for reasons attributable to the Contractor (including without limitation errors or delays in the Contractor's delivery of the Performance Guarantee or a parent guarantee, the Contractor's delay in obtaining Governmental Authorizations required to undertake the Construction Works), the Contractor shall be prohibited from requesting an extension to the Completion Deadline.

Article 2.2 Governmental Authorizations

If requested by the Contractor, the Employer shall provide reasonable assistance to the Contractor in order to obtain the following Governmental Authorizations under the relevant Laws of the Recipient Country:

(i) Governmental Authorizations to be obtained by the Contract pursuant to Article 1.9;

(ii) Governmental Authorizations (including customs clearance) required to transport or transship all goods and materials required for the Construction Works; and

(iii) Governmental Authorizations required to remove the Contractor's equipment from the Construction Site.

Article 3 – The Construction Supervisor

Article 3.1 Construction Supervisor

(a) In order to ensure the proper implementation of the Project, the Employer shall be entitled to appoint the Construction Supervisor to undertake the following tasks for and on behalf of the Employer:

(i) to generally oversee and supervise the Construction Works;

(ii) to instruct, provide approvals, and liaise with the Contractor in connection with this Contract and the Contractor's compliance herewith; provided that all instructions and approvals shall be in writing unless the matter is of an urgent nature;

(iii) to inspect or examine (or to oversee the inspection/examination process) the materials to be used for the Construction Works and the Project generally;

(iv) to inspect the parts of the Project that are completed, to undertake an inspection of the completed Construction Works (the "**Completion Inspection**") and to oversee the delivery of the Construction;

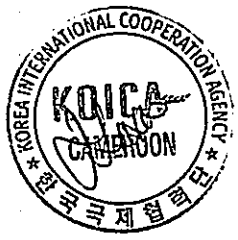
(v) to undertake all duties and obligations set out in this Contract and the Laws of the Recipient Country applicable to the Construction Works; and

(vi) to undertake all other duties delegated to the Construction Supervisor by the Employer.

(b) The Employer shall promptly notify the Contractor if it appoints the Construction Supervisor in accordance with Article 3.1(a) above.

(c) Unless otherwise expressly provided for in this Contract, the Construction Supervisor shall be deemed to have acted on behalf of the Employer to the extent it has exercised its rights or fulfilled its obligation under this Contract. The Construction Supervisor shall not amend or modify this Contract without the prior written consent of the Employer.

(d) The Construction Supervisor shall neither exempt the Contractor from any of its duties or obligations under this Contract nor increase or decrease any duty or obligation of the Contractor under this Contract without the approval of the Employer. None of the approvals, opinions, confirmations, verifications, agreements, investigations, examinations, instructions, notices, proposals, requests, tests and other similar actions (including disapprovals or failure to submit opinions) undertaken (or not undertaken) by the Construction Supervisor on behalf of the Employer shall be construed as a waiver, exemption or release of the Contractor's duties, obligations (including responsibility for errors, omissions, inconsistences, defects and non-compliance), or guarantees under this Contract.



(e) The Construction Supervisor's failure to expressly approve or disapprove the Construction Works, equipment or materials, or the Construction Supervisor's delay in approving or disapproving the Construction Works, equipment or materials shall not be construed to be an approval thereof and such failure or delay on the Construction Supervisor's part shall not, in any way, affect the right of the Employer to reject the Construction Works, equipment or materials.

(f) If the Contractor (acting reasonably) determines that the Construction Supervisor's instructions or decisions violate the terms of this Contract or hinder the performance of this Contract, it may, after detailing the specific circumstances and issues to the Employer, request that the Employer take necessary measures.

(g) The Contractor must submit to the Construction Supervisor copies of all documents that are submitted to the Employer.

Article 3.2 Construction Supervisor's Assistant

(a) The Construction Supervisor may authorize a specific person(s) to undertake specific tasks and may, at any time, withdraw or revoke such authorisation.

(b) The specific person(s) authorised by the Construction Supervisor pursuant to paragraph (a) above (the "**Construction Supervisor's Assistant**") may instruct the Contractor as necessary within the scope of that authority. All approvals, confirmations, verifications, agreements, investigations, examinations, instructions, notices, proposals, tests and other similar actions undertaken by the Construction Supervisor's Assistant shall have the same effect as if the Construction Supervisor itself undertook such actions; provided that the Construction Supervisor's Assistant shall have acted within the authority granted to it when undertaking such actions.

Article 4 - The Contractor

Article 4.1 General Obligations of the Contractor

(a) The Contractor shall be responsible for completing the Construction Works and for repairing any defects to the same in accordance with this Contract and the instructions of the Employer.

(b) The Contractor shall provide all personnel, goods, consumables and services required for the Construction Works and for repairing any defects in the same in a timely manner.

(c) The Contractor shall complete the Construction Works in accordance with the Design Documents and in a safe and proper manner. The Contractor's obligation to complete the Construction Works in a proper manner shall include undertaking work that any skilled developer would have undertaken to complete the Construction Works (even if such work is not specified in this Contract).

(d) The Contractor shall be responsible for selecting the appropriate construction method and for safely managing the Construction Site. The Contractor hereby warrants that the Contractor Documents, all temporary constructions and provisional works, and all design of all equipment and materials required to complete the Construction Works are compliant with terms of this Contract and further confirms and agrees that it will be liable for all inconsistencies and non-compliance thereof.

(e) If the Contractor wishes to propose a new method or construction method regarding the Construction Works or any part thereof, the Contractor must submit to the Construction Supervisor details of such proposed new method(s) prior to commencing work on the relevant Construction Works. If the Contractor wishes to make a material change to the method or construction method specified and agreed under this Contract, the Contractor must provide the Employer with prior written notice of such proposed changes, unless the changes are required on an urgent basis or if the Contractor reasonably determines there to be a risk of damage to the Construction Works or of bodily injury, in which case, the Contractor may, on an exceptional basis, take appropriate countermeasures and thereafter (but within 48 hours) provide written notice of the change in the construction method.

(f) Nothing in this Contract shall be construed as authorizing the Contractor to undertake the Construction Works or to take measures that may result in any change to the Contract Price and/or to this Contract. All such actions shall be subject to the prior written approval of the Construction Supervisor.

(g) Unless otherwise specified in this Contract:

(i) for each individual process, the Contractor shall submit to the Construction Supervisor the Contractor Documents in accordance with the procedures specified in paragraphs (h) and (i) below and the Construction Specification; and

(ii) such Contractor Documents shall be prepared either in English or in Korean in accordance with the Construction Specification and the Design Drawing. Additionally, additional information requested by the Construction Supervisor shall be included so that the design can be adjusted or reflected in the Design Drawing.

Prior to commencing the Completion Inspection, the Contractor shall submit to the Construction Supervisor the Contractor Documents, completion documents, the Construction Specification and/or the management and maintenance manual prepared in accordance with the Construction Supervisor's instructions. Such documents shall contain sufficient information necessary for the Employer to manage, maintain, deconstruct, reassemble, adjust and repair the relevant area or parts of the Construction Works.

(h) When submitting the Contractor Documents in accordance with paragraph (g) above:

(i) the Contractor shall provide the Construction Supervisor with [four (4)] copies of each document within the period set out in this Contract or as agreed in writing by the Parties; and

(ii) where the Construction Supervisor notifies the Contractor that it cannot approve the Contractor Documents or the amended Contractor Documents or that the submitted Contractor Documents do not comply with the terms of this Contract, the Contractor shall amend such Contractor Documents as promptly as possible so that they comply with the terms of this Contract and submit them for the Employer's review.

(i) If the Contractor wishes to propose any amendments, it must specify the proposed amendments and the reasons for the same in detail and must submit the same together with any other information (and their supporting documents) reasonably requested by the Construction Supervisor. To the extent the Contractor's proposal is to amend Contractor Documents that have already been submitted, the Contractor shall re-submit such documents reflecting the proposed amendment(s) in accordance with the procedures set out in paragraph (h) above.

(j) The Employer's or the Construction Supervisor's review of, approval of or expression of opinion on the Contractor Documents under this Contract is solely to oversee the Contractor's fulfilment of its obligations; thus any approval, expression of opinion, review or other similar action (including disapproval, absence of opinion or review) by the Employer or the Construction Supervisor or its agent shall not absolve the Contractor from any warranties, obligations or liability for any errors, omissions, inconsistencies, defects or nonconformity in the Contractor Documents. The absence of an explicit refusal to accept the Contractor Documents shall not be construed to be an approval and shall not, in any way, affect the right of the Employer to reject the Contractor Documents submitted in accordance with this Contract.

(k) The Contractor shall permit the Employer or any person designated by the Employer to visit the Construction Site or to inspect the accounting books of the Contractor and other documents or records related to the Contractor's fulfilment of the Contract.

(l) Even if the Contractor becomes subject to criminal punishment, civil liability or administrative sanctions for violating this Contract or applicable Laws, the Contractor shall not be released from its responsibilities and obligations hereunder, and if the Contractor violates the Laws of the Recipient Country regarding the Construction Works, is sanctioned by the judicial authorities, and is thereby delayed in completing the Construction Works, the Contractor shall indemnify the Employer for damages suffered and such compensation shall be separate from the sanctions imposed by the judicial authorities of the Recipient Country.

(m) The Contractor shall not engage in any action that may interfere with the Construction Works or cause damage to the Employer, and shall indemnify the Employer for any damage suffered by the Employer as a result of causes attributable to the Contractor.

Article 4.2 Performance Guarantee

(a) Unless otherwise specified in the Detailed Terms and Conditions, the Contractor shall, by the [Effective Date] pay the Employer a cash amount equivalent to [15%] of the Contract Price to guarantee the performance of its obligations hereunder (the "**Cash Guarantee**") or deliver to the Employer a Bank Guarantee for Performance in lieu of the Cash Guarantee. If the Employer agrees to exempt the Contractor from providing the whole or a portion of the Cash Guarantee, the Contractor shall deliver to the Employer a letter of undertaking pursuant to which it undertakes and covenants to pay the Cash Guarantee amount in cash upon the occurrence of certain events, including a breach by it of this Contract (the "**Letter of Undertaking**").

(b) If the Contract Period is extended or the Contract Price is increased due to changes in design of the Construction (the "**Design**"), each in accordance with this Contract, the Contractor shall provide the Employer with an updated Bank Guarantee for Performance reflecting the increased Contract Price or shall pay an additional Cash Guarantee. Unless otherwise specified in the Detailed Terms and Conditions, the updated Bank Guarantee for Performance or payment of the additional Cash Guarantee (as the case may be) must be submitted or paid within fourteen (14) days of the date on which the Contract Period is extended or the date on which the increase in the Contract Price is approved (as the case may be).

(c) The Cash Guarantee shall guarantee the performance of this Contract from the Effective Date until a specific date falling after the end of the Contract Period; provided that, if the Contractor has, in lieu of the Cash Guarantee, delivered the Bank Guarantee for Performance or the Letter of Undertaking, each such document shall specify that the guarantee period shall expire sixty (60) days after the end of the Contract Period, unless otherwise agreed by the Parties.

(d) If the Contractor submits the Bank Guarantee for Performance in lieu of the Cash Guarantee, the Contactor shall be liable for all fees, taxes and expenses incurred in connection with the issuance, preparation, extension, replacement and execution of such Bank Guarantee for Performance; provided that if the extension to the Contract Period which results in an extension to the initial guarantee period is for reasons not attributable to the Contractor, the costs incurred thereby shall be compensated by the Employer, such compensation not to exceed any actual costs incurred, subject to the Contractor submitting objective evidence (such as receipts) of the costs incurred.

(e) If deemed necessary, the Employer may request that the Contractor provide a guarantee issued by its parent company (a "**Parent Company Guarantee**") to guarantee the Contractor's performance of this Contract. The Parent Company Guarantee shall be in a form and substance approved by the Employer.

(f) If the Contractor fails to fulfill its obligations hereunder, the Performance Guarantee shall vest in the Employer and the Employer shall have the right to terminate this Contract. If in respect of a long-term construction works contract, the Contractor fails to enter into a second or subsequent contract, the Employer may construe such failure as the Contractor's refusal to comply with its contractual obligations and accordingly, the Performance Guarantee shall vest in the Employer.

(g) Where the Contractor has submitted the Letter of Undertaking, the Employer may demand immediate payment of an amount equivalent to the Performance Guarantee upon the occurrence of an event which results in the vesting of the Performance Guarantee in the Employer. The Contractor shall pay the relevant amount under the Performance Guarantee (in cash) within the period prescribed by the Employer.

(h) None of the monies paid or received under the Performance Guarantee that vests in the Employer pursuant to paragraphs (f) or (g) above shall be used by the Employer to offset against any outstanding amounts payable in respect of a part(s) of the Construction Works that are already completed. For the avoidance of doubt, notwithstanding the preceding sentence, where the Contractor has been exempted from paying the Cash Guarantee under the proviso in paragraph (a) above and fails to pay the Cash Guarantee amount in breach of the Letter of Undertaking, the Employer may offset the Cash Guarantee amount (or a part thereof) against the amount equivalent to the outstanding amount payable in respect of a part(s) of the Construction Works that are already complete.

(i) Upon expiry of the Contract Period or upon the Contractor's fulfilment of all of its obligations under this Contract, the Employer shall return the Performance Guarantee to the Contractor upon the Contractor's request.

Article 4.3 Construction Site Manager

(a) The Contractor shall appoint a person to represent it on the Construction Site (the "Site Manager"). When notifying of the commencement of the Construction Works under Article 4.17, the Contractor shall submit its letter appointing the Site Manager.

(b) If the name of the Site Manager is not stated in the Detailed Terms and Conditions, the Contractor shall provide the Construction Supervisor with the name and details of the person it wishes to appoint as the Site Manager [fifteen (15)] days prior to the scheduled Commencement Date and obtain the approval of the Employer or the Construction Supervisor before the Commencement Date.

If the Construction Supervisor withholds or revokes its approval of the Site Manager candidate submitted by the Contractor, the Contractor shall nominate another candidate and provide the Construction Supervisor with such candidate's name and details. The Contractor shall not revoke the appointment of the Site Manager or replace the Site Manager without the prior written approval of the Construction Supervisor.

(d) If the Site Manager is absent from the Site during the Construction Works, the Contractor shall, subject to obtaining the prior written approval of the Construction Supervisor, appoint another appropriate person and notify the Construction Supervisor of such appointment.

(e) The Site Manager shall receive instructions from the Construction Supervisor in accordance with Article 3.1 hereof for and on behalf of the Contractor.

(f) The Site Manager may delegate its authority or functions to a person possessing the requisite capabilities and functions. Any such delegation shall be effective from (and be subject to) the Construction Supervisor's receipt of a written notice from the Site Manager specifying the name of the delegatee and the power and functions being delegated.

(g) The Site Manager and any delegatee of the Site Manager (appointed pursuant to

paragraph (f) above) must be fluent in the languages set out in Article 1.4 hereof. If the Site Manager is not fluent in the languages specified in Article 1.4 hereof, the Contractor shall employ an interpreter at its own cost and expense and take all such measures necessary to ensure that there are no difficulties in communicating with the Construction Supervisor.

Article 4.4 Subcontracting

(a) The Contractor may, subject to obtaining the prior written consent of the Construction Supervisor, subcontract a part of the Construction Works but the Contractor shall not subcontract the whole of the Construction Works.

(b) When seeking the prior written approval of the Construction Supervisor under paragraph (a) above, the Contractor shall provide the Construction Supervisor with details of the subcontractor, including, without limitation, the following:

(i) the relevant performance history of the subcontractor;

(ii) the terms and conditions of the subcontract as proposed by the subcontractor or the principal terms and conditions of the subcontract; and

(iii) financial information necessary to determine whether the subcontractor has the requisite capacity or such other information requested by the Construction Supervisor.

(c) The Employer's consent to subcontract shall not release the Contractor from any warranties, guarantees, covenants, undertakings, obligations or liability hereunder, and the Contractor shall be liable for any and all acts, omissions or non-performance of the subcontractor, its agent(s) and/or its executives and employees.

(d) In relation to any subcontract, the Contractor shall notify the Construction Supervisor of the following:

(i) the scheduled commencement date of each subcontracted service (which notice shall be provided [twenty-eight (28)] days prior to such scheduled commencement date) and/or matters otherwise agreed in writing by the relevant parties; and

(ii) the actual commencement at the Site of each subcontracted service.

(e) If the Employer becomes aware that the subcontractor may suspend rendering its services under the subcontract or cancel or terminate the subcontract due to the Contractor's failure to comply with its payment obligations under the subcontract, the Employer may, in its sole discretion, pay the subcontractor directly and notify the Contractor of the same. In such case, the Employer shall be entitled, with prior notice to the Contractor, to deduct the amount directly paid to the subcontractor from the amount payable by it to the Contractor.

(f) The Contractor shall indemnify and hold harmless the Employer from any loss, damage or costs incurred by the Employer as a result of the Contractor's failure to pay the subcontract price.

(g) If the Employer makes any payment directly to the employee(s) or the subcontractor(s) of the Contractor in order to comply with applicable Laws, governmental order or arbitral award, the Contractor shall reimburse the Employer for such payment made.

(h) The Employer may deduct or offset any amount payable by the Contractor from any amount payable by the Employer to the Contractor.

Article 4.5 **Cooperation in respect of Relevant Construction Works**

If there are other construction works close to or related to the Construction Works hereunder (the "**Relevant Construction Works**"), the Contractor shall take all necessary measures to ensure that the Relevant Construction Works are not hindered or disrupted.

Article 4.6 **Standards and Criteria**

The Contractor shall, in compliance with this Contract and the instructions of the Construction Supervisor, establish standards or criteria to be applied to the Construction Works. The need to apply the standards or criteria consistently shall not excuse any breach by the Contractor of this Contract or the instructions of the Construction Supervisor or the Contractor's omission to take action under this Contract or in accordance with the instructions of the Construction Supervisor unless the Contractor has obtained the prior written approval of the Employer.

Article 4.7 **Safety Obligations**

(a) In undertaking the Construction Works and any repair works, the Contractor shall comply with all safety and health-related Laws of the Recipient Country and shall strictly abide by the Employer's safety and health-related policies and standards (including, but not limited to, the safety management manual attached to the Special Conditions) (collectively referred to as the "**Standards**" in this Article 4.7). The Contractor shall submit to the Construction Supervisor documents evidencing that it has complied with the safety and health-related Laws and Standards.

(b) The Contractor shall prepare and submit to the Employer the safety, environment and quality management plan specified in Article 4.17(a)(iv) hereof, conduct safety inspections to prevent industrial accidents, and take all necessary measures, including without limitation installing safety facilities and purchasing insurance. The costs for undertaking all necessary measures for safety management (the "**Safety Management Costs**") must be more than 0.5% of the Contract Price (which, for the purposes of the calculations hereunder shall be the Contract Price excluding any reserve funds (to the extent the Contract Price is inclusive of any reserve funds)) and the Contractor shall prepare and submit to the Employer the Calculation Statement reflecting the Safety Management Costs as a separate line item. The safety, environment and quality management plan specified in Article 4.17(a)(iv) hereof must include details of how the Safety Management Costs will be utilised.

(c) The Contractor must utilize the Safety Management Costs in compliance with the safety, environment and quality management plan submitted at the time the Notice of Commencement is made and in compliance with the applicable safety and health-related Laws of the Recipient Country. When requesting (pursuant to Article 12.3 hereof) payment in respect of the portions of the Construction Works that are complete, the Contractor shall also submit to the Employer documents evidencing the amount of Safety Management Costs actually expended and request the *ex post* settlement of such costs. When requesting the *ex post* settlement of the Safety Management Costs actually

expended, the Contractor shall also attach to its request a confirmation letter from the Construction Supervisor. In settling *ex post* the Safety Management Costs actually expended, the Employer shall have the right to deduct from the Contract Price such amounts that have been used for a different purpose, that have not been used or for which evidence is insufficient.

(d) Even if the Safety Management Costs actually expended are in excess of the amounts stated in the Calculation Statement, if the Employer considers such expenditure to have been appropriate based on the evidence and the Construction Supervisor's confirmation letter submitted pursuant to paragraph (c) above, the Employer, within reason, may approve and settle such additional amounts. In such case, the Contractor shall submit to the Employer an updated safety management plan for the Employer's approval.

(e) The Contractor must directly undertake all works that relate to the settlement of payment of the Safety Management Costs and is hereby restricted from delegating any such duties or obligations to a third person.

Article 4.8 Quality Assurance

(a) The Contractor must prepare and submit to the Employer a quality management plan that is compliant with this Contract and the Construction Specification. The Contractor must further submit all such documents evidencing its compliance with such quality management plan and the procedures specified therein, as requested by the Construction Supervisor. The Construction Supervisor shall have the right to inspect and verify the implementation status of the quality management plan.

(b) The Contractor's compliance with the quality management plan shall not release or exempt the Contractor from any warranties, guarantees, covenants, undertakings, obligations or liability hereunder.

Article 4.9 Sufficiency of Contract Price

(a) Unless otherwise specified in this Contract, the Contract Price (including any reserve funds, if any) shall be considered to be sufficient to cover all expenses necessary for the Contractor to perform all of its obligations under this Contract, including, without limitation, the Construction Works, tests, commissioning, completion of construction and repairing of defects. The Contractor hereby represents and warrants the sufficiency of the Contract Price for these purposes.

Unless otherwise specified in this Contract, the Contractor shall be responsible for all costs (including but not limited to taxes) incurred in undertaking the Construction Works, and shall be liable for all risks associated with the Construction Works and the completion thereof.

Article 4.10 Notification of Site Status

(a) If during the Construction Works the Contractor finds that the Construction Site, including but not limited to the geology, water, underground utilities are different from the details specified in the Design Documents, the Contractor shall, through the Construction Supervisor, notify the Employer of the same without delay.

(b) Upon receipt of the notice under paragraph (a) above, the Employer shall promptly cause the Construction Supervisor to inspect the Site and to submit an opinion on whether a change (in accordance with Article 11.2 hereof) to the Construction Works is required. The Employer may instruct the Contractor to modify the construction design in accordance with Article 11.2 hereof, taking into consideration the opinions and comments of the Construction Supervisor.

Article 4.11 Site Access and Removal of Obstructions

(a) Unless otherwise specified in this Contract, the Employer shall provide the Contractor with effective access and a right to occupy the Site. If passages or facilities outside the Construction Site is required to carry out the Construction Works, the Contractor shall obtain the same (or the rights to the same) at its own cost and risk.

(b) The Contractor shall not unnecessarily or improperly obstruct public traffic on the roads or the Site, or infringe the rights of owners or occupants of adjacent facilities or lands. The Contractor hereby indemnifies and holds harmless the Employer from all damages, losses and expenses (including legal advisory fees and expenses) arising out of its violation of the obligations hereof.

(c) The Contractor hereby acknowledges and approves the appropriateness and availability of the access road(s) to the Site. The Contractor shall take all necessary measures (including operating vehicles that comply with weight, width and height restrictions set by the Laws and installing appropriate signs) to prevent damage to roads or bridges within the Site.

(d) Except as otherwise specified in this Contract:

(i) the Contractor shall be responsible for maintaining and repairing any damage to the access road(s);

(ii) the Contractor shall install signs, including direction signs on the access road(s) and obtain all necessary Governmental Authorizations in respect thereto;

(iii) the Employer shall not guarantee the appropriateness or availability of a specific access road, and shall not be liable for any claims thereon; and

(iv) any costs incurred as a result of an access road being unsuitable or unavailable for use by the Contractor shall be borne by the Contractor.

Article 4.12 Transportation of Goods

Except as otherwise specified in this Contract:

(a) The Contractor shall notify the Employer of the anticipated delivery to the Site of all equipment or major goods required for the Construction Works twenty-one (21) days prior to the scheduled delivery date thereof.

(b) The Contractor shall be responsible for the packaging, shipping, transportation, loading and unloading, storage and protection of all goods required to undertake and complete the Construction Works.

(c) The Contractor hereby indemnifies and hold harmless the Employer from and against all damages, losses and expenses (including legal advisory fees and expenses) incurred in relation to the transportation of all goods and further undertakes to negotiate with

and to indemnify any third parties for all claims arising in respect of transportation of the goods.

Article 4.13 **Bringing Equipment On-Site**

The Contractor shall be responsible for all equipment related to the Construction Works. Equipment brought onto the Site shall be used only for the Construction Works. The Contractor shall obtain the consent of the Employer or the Construction Supervisor prior to removing any major equipment from the Site.

Article 4.14 **Protection of the Environment**

(a) The Contractor shall take all reasonable procedures to protect the Site and its surrounding environment, and to reduce and prevent pollution, noise, dust, and all such other damage that may occur to people and property in connection with the Construction Works.

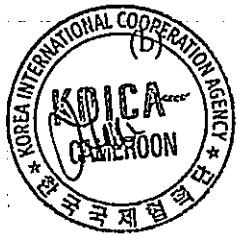
(b) The Contractors shall comply with all Laws, policies, standards (including the Standards), procedures of the government of the Recipient Country as well as the requirements of the Employer.

(c) The Contractor shall ensure that air pollutants, wastewater, wastes and other pollutants generated in the course of implementing this Contract shall not exceed the tolerance limit set by the Construction Specification or the applicable Laws of the Recipient Country.

(d) Wastes generated at the Construction Site shall be the responsibility of the Contractor and the Contractor shall deal with the same at its own cost and expense in compliance with all relevant Laws of the Recipient Country.

Article 4.15 **Electricity, Water, Gas, Steam**

(a) The Contractor shall be responsible for procuring all of the electricity, water, gas, steam and other services required to undertake the Construction Works.



(b) Prior to utilizing the electricity, water, gas, steam and other utilities and services on the Site for the Construction Works, the Contractor shall obtain the written approval of the Construction Supervisor. The Contractor shall be liable for any and all costs arising in connection with the utilization and measurement (including any measuring equipment used) of such utilities and services.

(c) The Contractor shall consult with the Construction Supervisor regarding the use, usage and usage costs of the electricity, water, gas, steam and other utilities and services described herein.

Article 4.16 **Equipment and Materials Furnished by the Employer**

(a) The Employer shall, at its own cost and expense, supply the Contractor with materials described in the statement. The Contractor who has been furnished with such materials shall inspect the materials and immediately notify the Construction Supervisor of any quantity shortage, defects or damage to the materials. Unless otherwise agreed by the

Parties, the Employer shall remedy any quantity shortage, defect or damage notified by the Contractor.

(b) After the process of inspection and remedy as described in paragraph (a) above is complete, the Contractor shall be responsible for protecting and storing the materials furnished by the Employer.

Article 4.17 **Commencement and Progress Reports**

(a) The Contractor shall commence the Construction Works in accordance with this Contract, and upon commencement, the Contractor shall submit to the Employer the Notice of Commencement, which statement shall include the following documents:

(i) a report on the designation of a construction engineer in accordance with the construction-related Laws of the Recipient Country (or, if no such Laws exist in the Recipient Country, a report on the designation of a construction engineer in accordance with the construction-related Laws of Korea or a report on the designation of a construction engineer in the form and substance satisfactory to the Employer);

(ii) construction schedule (this must, in principle, be the construction schedule that has been approved by the Employer unless there is a justifiable reason (such as there being not enough time to obtain prior approval), in which case the construction schedule hereunder may be the latest version submitted to the Employer);

(iii) appointment letter in respect of the Site Manager;

(iv) safety, environment and quality management plan;

(v) personnel and equipment commitment plan for each stage of the Construction Works;

(vi) photo of the Site taken before commencement of the Construction Works;

(vii) the Calculation Statement (unless the Calculation Statement is submitted at the time of executing this Contract or before commencement of the Construction Works, in which case, the obligation hereby to submit the Calculation Statement shall only apply if there have been any changes since submission); and

(viii) matters stipulated in the Detailed Terms and Conditions, such as subcontract matters requiring approval and such other documents or information designated or requested by the Employer.

(b) If, during its fulfilment of its obligations under this Contract, changes are required to the documents set out in paragraph (a) above due to changes in the Design or to the provisions of this Contract, the Contractor shall, without delay, submit such modified documents to the Employer for approval.

(c) If the Employer determines that changes or adjustments are necessary to the documents submitted in accordance with paragraph (a) above, it may request that the Contractor re-submit such documents after making the necessary changes or adjustments.

(d) The Employer may require the Contractor to submit by the 14th day of each month the following documents regarding the progress of the Construction Works in respect of the previous month, and in such case, the Contractor shall comply with such request:

(i) monthly progress rate and the monetary value of the Construction Works carried out in the relevant month;

(ii) manpower and equipment committed to the Construction Works and status of materials in the relevant month;

(iii) changes to this Contract and adjustments to the Contract Price;

(iv) photos of the Site showing progress of the Construction Works; and

(v) such other matters as may be specified by the Employer.

(e) In addition to and separate from the monthly reports described in paragraph (d) above, the Employer may request regular reports on other matters relating to the Construction Works, including details of countermeasures to be adopted in respect of delays in the Construction Works.

Article 4.18 Site Management

(a) Unless otherwise specified in this Contract, the Contractor may restrict access to the Site of persons other than the Contractor Personnel, the executives and employees of the Employer and the Construction Supervisor (collectively, the "**Employer Personnel**") and any persons (including persons who have entered into a contract with the Employer) of whom the Employer notifies the Contractor. With respect to the safety of the Site, the Contractor shall be responsible for the management of the Contractor's equipment, the Employer's equipment, facilities, materials and all other properties and personnel on the Site.

(b) The Contractor shall ensure that no unnecessary obstacles are left unattended at the Site whilst the Construction Works are being undertaken and the Contractor shall be responsible for the proper storage and removal of its equipment or surplus materials. The Contractor must remove waste, hazardous substances and temporary construction facilities that are no longer needed from the Site.

Upon the issuance of a taking over certificate, unless otherwise specified in this Contract, the Contractor shall remove from the Site all of its equipment, materials, waste, hazardous substances and temporary construction facilities. The Contractor shall maintain the Site and Construction in a clean and safe condition. Without prejudice to the generality of the foregoing, the Contractor may, subject to obtaining the Employer's consent, keep at the Site such goods required to fulfil its defect repair obligations during the Defect Notification Period.

Article 4.19 Obstructions

(a) Where fossils, coins, treasures or antiques, artifacts (including structures) and items with geological or archaeological value are found on the Site, the Employer shall determine how to deal with them unless otherwise specified by applicable Laws. The Contractor shall take reasonable precautions to ensure that its employees or other persons do not remove or damage such finds.

(b) Upon discovering any of the finds described in paragraph (a) above, the Contractor shall immediately notify the Construction Supervisor of the same and the Employer shall deliver instructions regarding such finds. If it is expected that completion of the Construction will be delayed or that additional costs will be incurred as a result of such finds, the Contractor shall notify the Construction Supervisor of such fact without

delay.

Article 4.20 **Management of Civil Complaints**

(a) In implementing the terms of this Contract, the Contractor shall use its best efforts to ensure that residents residing near the Construction Site are not inconvenienced by the Construction Works and to not engage in disputes with such residents.

(b) The Contractor shall promptly resolve any complaints regarding the Construction Works that are raised by residents residing near the Construction Site or any disputes arising therefrom at its own cost and risk. Under no circumstances will the Contractor be entitled to request an extension of the Completion Deadline or an increase in the Contract Price because of complaints raised by residents residing near the Construction Site or such other objections related to the Project or the Construction Works which occur in the Recipient Country.

Article 4.21 **Obligations of Integrity**

(a) Based on mutual trust with the Employer, the Contractor hereby undertakes to comply with the Code of Conduct that are included in this Contract, and further undertakes not to engage in any unfair acts, including without limitation, collusion during the bidding, selection, contracting process and whilst carrying out its contractual obligations hereunder, and to not provide any unfair benefits, including without limitation money and goods, entertainment (including employment opportunities to relatives) to the Employer's executives, employees and to public officials.

Unless otherwise specified in this Contract, the Contractor shall submit to the Employer the Integrity Undertaking (in the form set out in Appendix 1 hereto) with the Cde of Conduct attached thereto.

Article 5 – Management of Manpower

Article 5.1 **Construction Site Workers**

(a) The Contractor shall hire workers with the skills and experience needed for the construction or management of the Construction Works, and shall be liable for all acts taken (or not taken) by such workers.

(b) If the Employer determines that a worker hired by the Contractor is not suitable for the construction or management of the Construction Works and requests the replacement of such worker, the Contractor shall immediately replace such worker. The Contractor shall not re-hire the replaced worker for the construction or management of the Contract without the separate approval of the Employer.

(c) The Contractor shall manage its personnel in compliance with the labor-related Laws of the Recipient Country. All costs arising in connection with such management shall be borne solely by the Contractor.

Article 5.2 **Remuneration and Working Conditions of Workers**

Within 72 hours of the Construction Supervisor's request, the Contractor shall provide documents evidencing that all wages payable to its employees and workers have been paid. If the Employer becomes aware that the Contractor has failed to pay its employees and workers their wages, the Employer may, in its sole discretion, pay such wages directly to the Contractor's employees and workers, with notice to the Contractor. Any amount of wages that are paid directly by the Employer in this way may be deducted from the Contract Price payable by the Employer to the Contractor.

Article 5.3 Employer Personnel

The Contractor shall not solicit, attempt to solicit or cause to be solicited any of the Employer Personnel for its own benefit.

Article 5.4 Compliance with Labor Laws

(a) The Contractor shall comply with any and all Laws relating to employment (including wages and working hours), health, safety, benefits and immigration applicable to the Contractor Personnel.

(b) The Contractor shall ensure that all Contractor Personnel shall complies with any and all applicable Laws, including Laws relating to health and safety at construction sites.

Article 5.5 Occupational Safety and Health

(a) The Contractor shall take all reasonable measures necessary to maintain the health and safety of the Contractor Personnel. The Employer may provide the Contractor with reasonable support necessary for the Contractor to comply with its obligations of occupational safety and health.

The Contractor shall appoint and deploy at the Site an occupational safety and health manager who shall be responsible for ensuring safety and preventing accidents on the Site. The occupational safety and health manager shall be suitably qualified with relevant experience and competency required for the job and shall have the authority to give instructions regarding the safety and health of all personnel (whether workers or visitors) at the Site and to take all such measures necessary to prevent accidents on the Site. During the Contract Period, the Contractor shall provide the occupational safety and health manager all the support necessary or required in order for such manager to properly exercise his/her authority.

(c) In the event of an accident related to occupational safety and health, the Company shall promptly notify the Construction Supervisor of the details of such accident. The Contractor shall prepare and maintain records of its employees' health, safety, benefits and property damage, as reasonably requested by the Construction Supervisor. When the Contractor applies for payment in respect of the portions of the Construction Works that are complete pursuant to Article 12.3 hereof, the Contractor shall also prepare a separate expense record of the occupational safety and health-related expenses incurred during the relevant period or work and submit the same to the Employer together with all supporting documents.

Article 5.6 Contractor Personnel

(a) All Contractor Personnel shall be suitably qualified, proficient and experienced in the field in which they work. The Construction Supervisor shall be entitled to request the replacement of any Contractor Personnel, including the representative of the Contractor, if any of the following is found to be applicable:

(b)
(i) where misconduct or negligence persists;
(ii) where the relevant personnel is incompetent or negligent in performing his/her duties;
(iii) where the relevant personnel fails to comply with the provisions of this Contract; or
(iv) where the relevant personnel continues to engage in acts that are detrimental to safety, health or the protection of the environment

(c) The Contractor shall not delay in taking measures to replace the relevant personnel with someone more suitable.

Article 5.7 Management of Contractor Personnel

(a) The Contractor shall take all reasonable measures to prevent the illegal acts, riots or disorderly conduct of the Contractor Personnel, and to preserve and protect the tranquility, lives and property on the Site and around the Site.

(b) The Contractor shall comply with and implement regulations, orders and requirements of the Government Authorities of the Recipient Country regarding the prevention and quarantine of infectious diseases.

(c) The Contractor shall take all measures necessary, including strengthening internal and external gender equality training for the Contractor Personnel (including its subcontractors and partners), to prevent sexual harassment and sexual violence and shall ensure that sexual harassment and sexual violence (whether in verbal or non-verbal form) does not occur during the implementation of and in relation to the performance of the Construction Works.

KOREA INTERNATIONAL COOPERATION AGENCY KOICA CAMEROON 한국국제협력단

Article 6 – Equipment, Materials and Technology

Article 6.1 Construction Method

The Contractor shall undertake the Construction Works in good faith (i) in accordance with the construction methods set out in this Contract, (ii) as a constructor qualified and experienced in accordance with international construction industry practice, and (iii) using appropriate equipment, new materials and facilities.

Article 6.2 Inspection of Materials

(a) Materials to be used for the Construction Works must all be new and must meet the quality assurance standards of the Recipient Country. The quality, specifications, product name of each material must conform to the Design Documents. If such details

are not clearly specified in the Design Documents, the materials used must be new and of standard quality or higher as acceptable to the Employer and must be the most suitable material for achieving the purpose of this Contract.

(b) Before using any material, the Contractor shall submit samples, introductory documents, etc. for inspection by the Employer or the Construction Supervisor, and any materials that are rejected shall be immediately replaced and be subject to re-inspection.

(c) Materials rejected at the end of the inspection process described in paragraph (b) above must not be used for the Construction Works. If the Contractor objects to the inspection results under paragraph (b) above, it may request that the Employer re-inspects the relevant material.

(d) If the Contractor requests an inspection or re-inspection (under paragraph (c) above) of the materials to be used for the Construction Works, the Employer must not delay without justifiable reasons.

(e) The Contractor must immediately remove from the Site and replace any rejected materials. If the Contractor fails to remove and replace such rejected material, the Employer may itself remove or replace the rejected materials and any costs incurred as a result shall be borne by the Contractor.

(f) The Contractor shall be liable for all costs arising in connection with inspection of the materials and shall not be entitled to request an extension to the Completion Deadline as a result of the inspection or re-inspection of the materials.

(g) If any of the materials requires testing or combining, such testing or combining shall be conducted by the Contractor in the presence of the Employer.

(h) Construction Works involving the construction or installation of structures underwater or underground, or of structures that will not be easy to inspect after completion of the Construction, shall be constructed and installed in the presence of the Construction Supervisor; provided that if the Contractor obtains the prior written approval of the Construction Supervisor and it is possible to verify the construction method through photos, videos and other similar methods, the relevant Construction Works may be carried out without the presence of the Construction Supervisor.

(i) If the Contractor undertakes the Construction Works in violation of any of the conditions in paragraphs (a) through (h) above, or in a way that does not conform to the Design Documents, the Employer shall be entitled to demand that Construction be re-constructed or alternatively constructed.

(j) Nothing in paragraphs (b) through (i) above shall entitle the Contractor to request an increase or decrease to the Contract Price or an extension to the Completion Deadline; provided that, if upon a re-inspection of materials pursuant to paragraph (c) above, it is determined that the relevant material was indeed suitable, the Contractor may request an extension of the Completion Deadline up to the period of time that was required to complete the relevant re-inspection.

Article 6.3 Testing and Commissioning

(a) This Article 6.3 shall apply to all tests undertaken under and pursuant to this Contract.

(b) If requested by the Construction Supervisor, the Contractor must submit a testing and

commissioning plan in respect of the Construction Works within [sixty (60)] days of the Effective Date. The testing and commissioning plan shall include the following details:

(i) the type of tests to be conducted;

(ii) the location, number of tests and frequency of testing;

(iii) testing and commissioning conditions (including normal operating conditions and emergency operating conditions);

(iv) participants (must include a person designated by the Construction Supervisor);

(v) form of the test results report; and

(vi) such other requirements specified in the Construction Specification.

(c) The Construction Supervisor shall review the testing and commissioning plan. If, upon review, the Construction Supervisor determines that the testing and commissioning plan does not conform with this Contract, the Construction Supervisor shall notify the Contractor of the results of its review (including the reasons for its conclusions) in writing.

(d) Upon receipt of the notice mentioned in paragraph (c) above, the Contractor shall promptly revise the testing and commissioning plan at its own cost and expense and re-submit the same to the Construction Supervisor.

(e) The Contractor shall provide any and all documents and other information, and access to electricity, equipment and device, fuel, consumables, system, materials, services, and suitably qualified and experienced employees required to perform the testing and commissioning specified in this Contract, and shall bear all of the costs incurred in connection therewith.

(f) Unless otherwise agreed by the Parties, the Contractor must conduct all testing and commissioning in accordance with the approved testing and commissioning plan. The Employer, the Construction Supervisor and such other Employer Personnel hereby have the right to attend all tests.

(g) The Construction Supervisor may request that the Contractor change the location and details of a testing and commissioning or conduct additional testing and commissioning. If, as a result of such changes or additional testing and commissioning, it is determined that the relevant equipment, materials or technology do not conform with this Contract, all related costs shall be borne by the Contractor.

(h) If the Construction Supervisor fails to appear at the test site at the agreed time, and does not provide any separate instructions, the Contractor may perform the testing and commissioning as scheduled.

With respect to all testing and commissioning performed under this Contract, the Contractor shall prepare and submit to the Employer a report or certificate. If the results of the relevant testing and commissioning are positive, the Construction Supervisor shall either approve and accept the Contractor's testing and commissioning certificate or issue a certificate having the same effect. If the Construction Supervisor fails to attend a testing and commissioning, the related report shall be deemed to have been approved.

Article 6.4 Re-testing and Re-commissioning

(a) If an investigation, inspection, survey or testing and commissioning shows the facilities,

materials, design or technologies (or any part thereof) to be defective or non-conforming with this Contract, the Employer may refuse to accept such facilities, materials, design or technologies after sending the Contractor a written notice stating the reasons for its refusal. The Contractor must, at its own cost and expense, promptly repair any defects, and resolve or remedy the issues raised in the Employer's notice of refusal and ensure that the relevant facility, material, design or technology conform with this Contract.

(b) If the Construction Supervisor requests the re-testing and re-commissioning of any facility, material, design or technology, such re-testing and re-commissioning shall be conducted under the same conditions as the previous test. Any costs incurred by the Employer due to its refusal to accept any facility, material, design or technology or any re-testing and re-commissioning thereof shall be borne by the Contractor.

(c) Where an inspection of the exterior of the Construction is insufficient or inappropriate to confirm the presence of any defects, the Employer may instruct the Contractor to open a part or parts of the Construction in order to re-test and re-commission the relevant part thereof. The Contractor shall not be entitled to request an extension of the Completion Deadline or an adjustment to the Contract Price as a result of such re-testing and re-commissioning.

(d) If a re-testing and re-commissioning under paragraph (c) above shows any part of the Construction to be defective or non-conforming with this Contract, any and all costs incurred in order to repair and remedy such defects shall be borne by the Contractor.

Article 6.5 Non-conforming Construction Works

(a) Regardless of the results of the test or certification, the Construction Supervisor may instruct the Contractor as follows:

(i) to remove and replace such facilities or materials that do not conform with this Contract;

(ii) to remove and re-do works that do not conform with this Contract; and

(iii) to undertake, on an urgent basis, work that is required to preserve the safety of the Construction Works, regardless of the reasons (including accident or unpredictable events).

(b) The Contractor shall comply with the Construction Supervisor's instructions within the time specified, or immediately if the matter is urgent under paragraph (a)(iii) above.

(c) If the Contractor fails to comply with the instructions, the Employer may hire a third party to perform the works in accordance with the relevant instructions. In this case, the Contractor shall bear all costs and expenses incurred by the Employer due to the Contractor's failure to comply with the instructions, including such costs incurred to hire the third party.

Article 6.6 Ownership of Facilities and Materials

To the extent permitted by the Laws of the Recipient Country, the Employer shall acquire ownership of the facilities and materials relating to the Construction Works, free from any and all encumbrances and restrictions, either:

(i) when such facility or material is delivered to the Site; or

(ii) when the Contractor becomes entitled to claim payment for such facilities and materials,

whichever occurs earlier.

Article 7 – Commencement, Delay, Suspension of Construction Works

Article 7.1 Commencement

Unless otherwise specified in this Contract, the Contractor shall commence the Construction Works on the scheduled Commencement Date set out in the Detailed Terms and Conditions ("**Commencement of Construction**"). Unless the applicable Laws of the Recipient Country require Governmental Authorizations to be obtained for the Commencement of Construction, the Contractor shall deliver the Notice of Commencement in accordance with Article 4.17 hereof and obtain the Employer's approval to the same by the scheduled Commencement Date. The date of Commencement of Construction shall be deemed to be the date on which the relevant Governmental Authorization is obtained or filed and accepted (if under the Laws of the Recipient Country, such Governmental Authorization is required to be obtained or filed) or on the date the Employer approves the Contractor's notification of Commencement of Construction (as the case may be).

Article 7.2 Completion Deadline

Unless otherwise specified in this Contract, the Contractor must complete and handover the Construction Works to the Employer by the Completion Deadline; provided that, to the extent the Construction Works are subject to milestones hereunder, the relevant sections of the Construction Works shall be completed and handed over to the Employer within the relevant milestone deadline. For the avoidance of doubt, completion of the Construction Works herein shall mean such time when the Employer completes its Completion Inspection and is ready to issue a taking over certificate.

Article 7.3 Contract Program

(a) The Contractor shall submit to the Employer the fully detailed Contract Program for the Construction Works within twenty-one (21) days from the Effective Date.

(b) The Employer shall have twenty-one (21) days from the date it receives the Contractor's Contract Program pursuant to paragraph (a) above to review and notify the Contractor of its comments. If upon review, the Employer determines that the Contract Program for the Construction Works as submitted by the Contractor does not conform with the conditions of this Contract, the Employer's notice mentioned in the immediately preceding sentence shall include details of the same, including reasons for the Employer's determination.

(c) Upon receipt of the Employer's notice of its determination under paragraph (b) above, the Contractor shall revise the Contract Program for the Construction Works to reflect

the Employer's comments and submit the same within seven (7) days of the date it receives the Employer's notice.

(d) If the Employer determines that the Contractor's Contract Program for the Construction Works reflects the terms and conditions of this Contract, it shall approve the Contract Program for the Construction Works (the "**Approved Contract Program**") and notify the Contractor of its approval.

(e) The Approved Contract Program shall be the basis for calculating the progress rate of the Construction Works.

(f) Upon the Employer's request, the Contractor shall prepare and submit to the Employer a progress report containing details of the core process and performance schedule.

(g) The progress report prepared and delivered pursuant to paragraph (f) above shall provide the basis for the Parties' discussions regarding progress-related issues and requisite measures.

(h) If the Employer determines that the actual progress rate of the Construction Works is slower than as planned under the Approved Contract Program, it shall have the right to request that the Contractor prepare and submit a detailed performance schedule.

(i) If the Contractor fails to prepare and submit a detailed performance schedule, despite the Employer's request, the Employer may withhold payment of the Contract Price until such time the Contractor submits the requested detailed performance schedule.

(j) The performance schedule prepared pursuant to paragraph (f) above, shall not replace the Approved Contract Program unless otherwise approved in writing. For the avoidance of doubt, unless the Employer approves changes to the Approved Contract Program in writing, the Contractor shall undertake the Construction Works in accordance with the Approved Contract Program, regardless of the submission of the performance schedule or the Parties' discussions regarding progress-related issues and shall be liable for any delays vis-a-vis the Approved Contract Program.

(k) The Employer's comments and opinions on the Contract Program for the Construction Works, the Approved Contract Program, and the performance schedule shall not release the Contractor from any of its obligations or responsibilities hereunder and shall not constitute a waiver of the Employer's rights vis-à-vis the Contractor.

Article 7.4 **Extension of the Completion Deadline**

(a) The Contractor may extend the Completion Deadline in accordance with Article 18.1 hereof if the Contractor is unable to handover the Construction to the Employer on the date specified in the Approved Contract Program or on the Completion Deadline due to the occurrence of any of the following events affecting the core process in the Approved Contract Program:

(i) changes to the Design under Article 11.3 hereof;

(ii) conditions for which the Contractor is hereby granted a right to request an extension of the Completion Deadline; or

(iii) such other causes attributable to the Employer.

(b) Upon the occurrence of an event described in paragraph (a) above that warrants an

extension to the Completion Deadline, the Contractor shall notify the Employer, through the Construction Supervisor, in accordance with Article 18.1 hereof.

(c) If the Employer approves the extension of the Completion Deadline in accordance with Article 18.1 hereof, the Contractor shall revise the Approved Contract Program to reflect the extended Completion Deadline and submit the same to the Employer.

(d) The Employer shall review the revised Approved Contract Program (the "Revised Contract Program") submitted by the Contractor in accordance with paragraph (c) above and shall notify the Contractor whether or not the Revised Contract Program is approved in accordance with Article 7.3(d) hereof. The Revised Contract Program approved by the Employer shall be the Approved Contract Program under Article 7.3(d) hereof.

(e) The Contactor may not request an extension to the Completion Deadline for any delays in any other process other than core process under the Approved Contract Program.

Article 7.5 Delays due to Government Authorities

(a) To the extent delays, which could not have been foreseen at the time of entering into this Contract, are caused by Government Authorities of the Recipient Country, notwithstanding the Contractor duly complied with all applicable Laws of the Recipient Country, including all procedures prescribed by and instructions of the Government Authorities of the Recipient Country, the Contractor may by written notice request an extension to the Completion Deadline, which notice shall (i) explain the impact of the delays caused by the Government Authorities on the Construction Works, (ii) confirm that none of the delays or causes thereof is attributable to the Contractor, and (iii) attach documentary evidence in support of (i) and (ii).

(b) The Contractor shall not be entitled to request an adjustment to the Contract Price as a result of any extension of the Completion Deadline pursuant to paragraph (a) above.

Article 7.6 Management of Delays in Progress

(a) Upon the occurrence of any of the following, the Employer may require the Contractor to prepare and submit a detailed performance schedule containing specific methods for complying with the progress rate specified in the Approved Contract Program:

(i) if any core process, such as the construction of the frame), is suspended for one (1) month or more; or

(ii) if the actual rate of progress is delayed by 10% or more compared with the progress rate specified in the Approved Contract Program under Article 7.3 above.

(b) Unless the Employer separately opines or comments on the detailed performance schedule submitted by the Contractor under paragraph (a) above, the Contractor shall undertake the Construction Works in accordance with such submitted detailed performance schedule. The Contractor shall take all actions necessary, including in relation to manpower, materials, construction methods, in order to undertake the Construction works in accordance with the detailed performance schedule, and the Contractor shall be liable for all costs arising in relation thereto, including all such costs incurred by the Employer. The payments made by the Contractor to the Employer in

accordance with this Article are separate from the liquidated damages specified in Article 7.7 below.

(c) Instead of agreeing to extend the Completion Deadline under Article 7.4 above, the Employer may instruct the Contractor to accelerate the Construction Works (by committing additional equipment and manpower to shorten the construction period) or require the Contractor to submit a plan for accelerating the Construction Works.

(d) If, pursuant to paragraph (c) above, the Employer requires the Contractor to submit a plan for accelerating the Construction Works, the Contractor shall submit such plan, which plan shall include details of the following:

(i) processes requiring accelerated work and plans to commit additional resources;

(ii) requirement to amend the Approved Contract Program and the Completion Deadline; and

(iii) costs for accelerating the works and comments regarding the adjustment of the Contract Price on account of such costs.

(e) If the Contractor submits the plan for accelerating the Construction Works in accordance with paragraph (d) above, the Employer shall review the same without delay and either approve the same as is or request that amendments be made.

Article 7.7 Liquidated Damages

(a) If the Contractor fails to comply with the Completion Deadline under Article 7.2 above, the Contractor shall be liable to pay the Employer liquidated damages. Liquidated damages shall be calculated by multiplying the number of days of delay (commencing from the day after the Completion Deadline under Article 7.2 and ending on the day the Construction Works pass the Completion Inspection) by the amount or percentage designated by this Contract.

(b) The Employer may offset the amount of liquidated damages payable by the Contractor against the Contract Price payable by it to the Contractor.

(c) The amount of liquidated damages payable shall be capped at the amount specified in the Detailed Terms and Conditions.

(d) The Contractor's payment of liquidated damages shall not relieve the Contractor of its obligations or responsibilities hereunder.

(e) Where the Employer is entitled to demand payment of liquidated damages hereunder, the Employer shall request that the Contractor take the necessary measures within a reasonable period of time in accordance with Article 13.1 hereof and if the Contractor fails to comply, the Employer may terminate this Contract in accordance with Article 13.2 hereof.

(f) If the amount of liquidated damages payable exceed the Performance Guarantee amount, the Employer shall be entitled to terminate this Contract.

Article 7.8 Suspension of Construction Works

(a) The Employer may suspend the Construction Works at any time. If the Construction

Works are suspended by the Employer, the Contractor must take appropriate protective measures to prevent any loss or damage to the Construction Works already in place.

(b) The Contractor must not remove any materials out of the Site during the period of suspension without the Employer's written consent.

(c) The Employer shall notify the Contractor of the reason(s) for suspending the Construction Works.

(d) If the Construction Works are suspended pursuant to this Article 7.8 for more than 180 consecutive days, the Contractor may request the Employer to resume the Construction Works. The Employer shall have twenty-eight (28) days from the date of such request to notify the Contractor whether the Construction Works can be resumed. If the Employer fails to notify the Contractor whether the Construction Works can be resumed within the twenty-eight (28)-day period specified above, the Contractor shall be entitled to notify the Employer that the relevant Construction Works affected by the suspension will be excluded from the scope of any Design Change (as defined below) under Article 11 hereof. If the affected Construction Works constitute the whole of the Construction Works under this Contract, the Contractor shall be entitled to terminate this Contract.

Article 7.9 Resumption of Construction Works

If the Employer instructs or notifies the Contractor to resume the Construction Works, the Employer and the Contractor shall jointly inspect the Construction Works and equipment and materials that were affected by the suspension. The Contractor shall be responsible for repairing any part of the Construction Works, equipment or materials that have been damaged during the period of suspension.

Article 8 - Completion Inspection

Article 8.1 Completion Inspection - Contractor's Obligations

(a) The Contractor must conduct the Completion Inspection.

(b) The Contractor shall notify the Employer (through the Construction Supervisor) of the Completion Inspection twenty-one (21) days prior to the scheduled date of the same (the "**Notice of Completion Inspection**"). Unless special circumstances exist, the period for completing the Completion Inspection shall be fourteen (14) days from its date of commencement.

(c) When delivering the Notice of Completion Inspection under paragraph (b) above, the Contractor must also submit to the Construction Supervisor the documents listed in Article 4.1(g)(ii) hereof. To the extent the Contractor is unable to attach certain of the documents to the Notice of Completion Inspection, the Construction Supervisor and the Contractor may agree to adjust the submission date; provided that under no circumstances will the Contractor be permitted to apply for a taking over certificate or claim that the Completion Inspection has completed without submitting all of the documents listed in Article 4.1(g)(ii) hereof.

(d) Unless otherwise specified in this Contract, the Completion Inspection shall be conducted in accordance with the Construction Specification and an inspection plan approved by the Employer.

(e) The Employer shall issue and deliver to the Contractor a taking over certificate immediately upon completion of the completion inspection in accordance with this Article.

Article 8.2 Failed Completion Inspection

If all or any part of the Construction fails to pass the Completion Inspection, the Employer may, in its sole and absolute discretion:

(i) conduct an inspection as specified in Article 8.1 of the part which has failed to pass the inspection;

(ii) refuse to accept all or a part of the Construction; or

(iii) issue a taking over certificate, on the condition that the Contractor shall continue to perform its obligations hereunder and the Employer shall be entitled to adjust the Contract Price downwards to reflect the decrease in the value of the Construction on account of the part(s) that has/have failed the Completion Inspection.

Article 9 – Acceptance of the Construction Works by the Employer and Site Clean-up

Article 9.1 Acceptance and Issuance of the Taking Over Certificate

(a) If the Completion Inspection of the Construction is completed and it is confirmed that the Construction has completed in accordance with the terms of this Contract and within the Completion Deadline, the Employer shall accept the whole or a part of the Construction and issue a taking over certificate in respect thereof.

(b) Fourteen (14) days prior to the date on which it deems handover of the Construction (in whole or in part) to the Employer will be possible, the Contractor may apply for issuance of a taking over certificate; provided that, the Contractor shall not apply for the taking over certificate until it has submitted all of the documents specified in Article 4.1(g)(ii) hereof. If the Contractor determines that independent use or handover of only a part of the Construction is possible due to the nature of the Construction, the Contractor shall apply for a taking over certificate in respect of such relevant part.

(c) The Employer shall take one of the following actions within twenty-eight (28) days from the date it receives the notice or application under paragraph (b) above:

(i) issue a taking over certificate stating therein that the Employer has accepted all or a part (excluding such parts not constructed and defects that do not fundamentally affect the Construction Works) of the Construction on the date prescribed in this Contract; or

(ii) issue a response to the Contactor refusing the request to issue a taking over certificate and specifying details of the Construction that are incomplete and where additional work is required (in which case the Contractor shall complete

the specified incomplete Construction Works and re-apply for the issuance of a taking over certificate).

(d) The Parties hereby acknowledge and agree that the Employer shall not be liable for the Construction to the extent the Employer has not issued a taking over certificate in accordance with this Article 9.1.

(e) After the issuance of a taking over certificate, the Contractor must remove, at its own cost and expense, its equipment, remaining materials, wastes, and temporary installations and such other facilities and materials from the Site.

(f) If any of the Contactor's equipment, remaining materials, wastes, and temporary installations and such other facilities and materials are not removed from and remain on the Site [twenty-eight (28) days] after the issuance of the taking over certificate for the whole of the Construction, the Employer shall be entitled to sell or dispose of them and the Employer shall be entitled to seek from the Contractor the reimbursement of any costs and expenses incurred by it as a result of it undertaking such sale or disposal.

(g) The Employer may offset or deduct the costs and expenses it incurs under paragraph (f) above from the Contract Price under Article 12..6.

Article 9.2 Partial Acceptance of the Construction Works

(a) The Employer has the right to accept only a part of the Construction.

(b) Unless agreed separately in writing, the Employer shall not use the Construction (or any part thereof) before the issuance of a relevant taking over certificate. To the extent the Employer uses the Construction (or any part thereof) prior to the issuance of a taking over certificate without any specific reason, the following shall apply:

(i) the Employer shall be deemed to have accepted such part of the Construction that it uses as of the date it commences such use;

(ii) the Contractor shall not be responsible for the management of such part; and

(iii) the Employer shall issue a taking over certificate (for the relevant part) upon the Contractor's request.

(c) If the Employer has come to use all or any part of the Construction through a written agreement between the Parties or due to reasons attributable to the Contractor, such use shall not constitute deemed acceptance by the Employer and the Contractor shall remain responsible for the management of the Construction until such time the Employer issues a relevant taking over certificate under Article 9.1 above.

(d) If the Employer issues a taking over certificate in accordance with paragraph (b)(iii) above, the Contractor shall complete all incomplete Construction Works and commence the Completion Inspection process as soon as practicable and in any case by no later than the expiration of the Defect Notification Period.

(e) If in the course of handover to and acceptance by the Employer the Contractor incurs any costs and expense for reasons not attributable to it, the Contractor may notify the Employer of the same and request a corresponding adjustment of the Contract Price.

(f) If a taking over certificate is issued for only a part of the Construction, the Contractor's liability for delay shall be decreased in proportion to the ratio of the monetary value of

the works accepted against the Contract Price for the whole of the Construction. The same shall apply in respect of the liquidated damages payable under Article 7.7 above. Notwithstanding the foregoing, the cap on liquidated damages shall continue to be based on the Contract Price and remain unchanged.

(g) The following provisions shall be applicable in priority to other provisions:

(i) liquidated damages that have accrued before the Employer accepts any part of the Construction or issues a taking over certificate in respect thereof shall not be subject to any reduction; and

(ii) if any part of the Construction is accepted or a taking over certificate in respect thereto is issued after the Completion Deadline has lapsed, the Contractor shall be liable for delay in respect of the entire Construction Works.

Article 10 – Liability for Warranty against Defects

Article 10.1 Completion of the Remaining Construction Works and Repair of Defects

(a) The Contractor shall undertake the following actions within the Defect Notification Period to ensure that the Construction complies with and satisfies the conditions required under this Contract:

(i) complete the matters specified in the punch list (a list of unfinished parts and defects that do not fundamentally affect the Construction Works) prepared at the time of issuance of the relevant taking over certificate; and

(ii) repair any defects or damages in all or any part of the Construction.

(b) If the Contractor determines that it will be difficult to fulfil the obligations under paragraph (a)(ii) above within the Defect Notification Period, it shall immediately notify the Employer of the additional period required to fulfil such obligations. In such case, the period for which the Contractor remains liable for the relevant defect shall be extended until the end of the additional period specified by the Contractor in its notice to the Employer.

(c) The Contractor must notify the Employer of any newly discovered defects or damage in the process of implementing its obligations under paragraph (a) above.

Article 10.2 Costs of Repair

(a) The Contractor shall be liable for all costs and expenses incurred in repairing defects unless the defect was a result of any of the following and it is confirmed that the Contractor was at no fault, in which case, the Contractor may seek from the Employer reimbursement of the costs and expenses it incurred. For the avoidance of doubt, the Contractor shall not be entitled to refuse to repair any defects on the grounds that the cause of such defect has not been confirmed or the defect is a result of any of the following. In other words, upon receipt of a notice of defect(s) from the Employer, the Contractor shall immediately take action to repair the defect(s) regardless of the cause thereof and to the extent it is later confirmed that the cause of the relevant defect(s) is attributable to the Employer or a third party, the Contractor may then seek

reimbursement from the Employer of its costs and expenses.

(i) where the Employer designs the Construction or the Employer is responsible for the Design;

(ii) where the construction and works have been undertaken by a third party or the machinery and equipment are of a third party;

(iii) where the Construction has been inappropriately operated, maintained or managed.

(b) In order to guarantee its repair obligations, the Contractor shall pay to the Employer an amount calculated by multiplying the defect security deposit rate (as specified in the Detailed Terms and Conditions) by the Contract Price (as may be adjusted hereunder) (the "**Defect Liability Deposit**") at the time the Taking over certificate is issued. If the Contractor fails to fulfil its obligations under Article 10.1 above within the Defect Notification Period, the Employer may pocket the Defect Liability Deposit; otherwise, the Employer shall return the Defect Liability Deposit to the Contractor on the date it issues its confirmation of completion of repair.

(c) The Defect Liability Deposit under paragraph (b) above may be substituted by a guarantee issued by a financial institution approved by the Employer.

Article 10.3 **Extension of the Defect Notification Period**

In the event the whole of or a material part of the Construction is defective and cannot be used for its intended purpose, the Defect Notification Period in respect of the whole of or the relevant material part of the Construction shall recommence as of the date the relevant defect is repaired, fixed or replaced. If the Contractor has delivered to the Employer a guarantee issued by a financial institution in order to guarantee its repair obligations, the Contractor must update and re-submit such guarantee in respect of the Construction that have been repaired, fixed or replaced to reflect the extended Defect Notification Period.

Article 10.4 **Failure to Comply with Obligations to Repair**

(a) If the Contractor anticipates that it will not be able to complete its repairs within the period designated by the Employer or other appropriate period, the Contractor must notify the Employer of the date by which it expects to complete its repairs.

(b) If the Contractor fails to complete its repairs by the date notified in accordance with paragraph (a) above, it shall be liable for all costs and expenses arising as a result of such failure. The Employer may adopt or implement the following measures:

(i) the Employer may undertake the repair works itself or by engaging a third party and the Contractor shall reimburse the Employer for all costs and expenses incurred in this regard;

(ii) the Employer may determine the cost of repairs and deduct such amount from the Contract Price; or

(iii) if the defect occurs in a material part of the Construction and if the defect has substantial impact on the entire Construction such that the Employer is unable to use it for its intended purpose, the Employer may terminate this Contract (in which case the Employer may claim from the Contractor all construction costs

already paid and all costs and expenses incurred in order to dismantle the Construction and clean-up the Construction Site).

Article 10.5 **Dismantlement of Defective Parts**

If a defect cannot be repaired, the Contractor may dismantle or remove the relevant part subject to obtaining written consent from the Employer. The Employer may decide at its discretion whether or not to agree to the dismantlement or removal of the defective part of the Construction and the Employer shall be entitled to claim damages arising as a result of the dismantlement or removal of the defective part of the Construction or to demand that the relevant part be re-constructed. In order to guarantee payment of damages related to the dismantlement or removal of the defective part of the Construction and/or payment of costs and expenses relating to any re-construction hereby, the Employer shall be entitled to demand an increase to the Defect Liability Deposit (notwithstanding Article 10.2(b) above) or that the Contractor takes other necessary measures.

Article 10.6 **Additional Inspection**

(a) If the repair of any defect affects the functionality and efficiency of the Construction, the Employer shall be entitled to demand that the Contractor conducts a re-inspection, including the Completion Inspection.

(b) The re-inspection shall be conducted by adopting the same method as used in the initial inspection.

Article 10.7 **Contractor's Right to Investigate the Cause of a Defect and to Access the Construction**

(a) Until the Employer's issuance of its confirmation of completion of repairs, the Contractor may, subject to obtaining written consent from the Employer, access the Construction to the extent necessary in order to record, operate and repair the Construction.

(b) Upon the Employer's request, the Contractor must investigate the cause of the defects. If, by the application of Article 10.2(a), the Contractor is not liable to bear the costs and expenses of repair, the costs and expenses incurred by the Contractor in connection with its investigation of the cause of the defects hereby shall be shared by the Employer and the Contractor in proportions to be separately agreed.

Article 10.8 **Issuance of Confirmation of Completion of Repairs**

(a) The Contractor shall comply with its obligations under this Article 10 until a confirmation of completion of repairs is issued by the Employer.

(b) The Employer shall issue a confirmation of completion of repairs within twenty-eight (28) days from the later of: (i) the expiration date of the Defect Notification Period, or (ii) the date on which the repair of the defect notified to the Contractor within the Defect Notification Period is completed (if the Parties have agreed to inspect the repairs then the relevant date shall be the date on which the repairs pass inspection). The Employer shall be entitled to delegate the issuance of the confirmation of completion of repairs to

the Governmental Authorities of the Recipient Country, and if the Governmental Authorities of the Recipient Country issues the confirmation, the Employer shall be deemed to have issued the same.

(c) If the Parties agree on a provisional warranty period separate from the Defect Notification Period, the Contractor shall be responsible for repairing, at its own cost and expense, any latent defects that occur during such provisional warranty period, notwithstanding the issuance of the confirmation of completion of repairs. The Employer shall permit the Contractor to access the Construction for the purpose of inspection or repair of such latent defects, and the Contractor shall repair such latent defects within a reasonable period.

(d) With regard to paragraph (c) above, if the Contractor fails to repair the latent defects within the period designated by the Employer, the Employer may, by using reasonable methods, repair such latent defects itself or through a third party and charge the Contractor for the costs incurred. The Contractor shall reimburse the Employer for all reasonable amounts expended in order to repair the relevant latent defects. The settlement by the Contractor of the Employer's costs and expenses regarding the repairs hereby shall not affect the Contractor's warranty obligations hereunder.

(e) The Parties shall be responsible for complying with their respective obligations hereunder even after the issuance of the confirmation of completion of repairs. This Contract shall remain in effect to the extent the Parties continue to bear such responsibilities.

Article 11 – Design Change and Adjustment of Contract Price

Article 11.1 Settlement and Determination of the Contract Price

(a) Unless otherwise specified in this Contract, the Contract Price shall be fixed and shall not be recalculated or reassessed.

(b) To the extent *ex post* settlement is contemplated, and to the extent the Parties have agreed in writing, the Contract Price may be fixed *ex post* by applying the unit price to the volume of Construction Works completed.

Article 11.2 Authority to Change the Design

(a) At any time before the issuance of a taking over certificate, the Employer may change the design of the Construction Works (a "Design Change") by providing instructions or by accepting any change proposals of the Contractor.

(b) The Contractor shall implement a Design Change.

(c) A Design Change may include the following but the following shall not necessarily always constitute a Design Change:

(i) changes arising due to any uncertainty, omission, error, or controversy in the Design Documents;

(ii) changes arising because the conditions of the Construction Site, such as geological features and water, etc. are different from those specified in the Design Documents;

(iii) changes arising because it is clear that utilization of new technologies or construction methods will result in a reduction in the costs of construction and shorten the construction period;

(iv) such other changes, including additional work accompanied by partial changes to the Project, the deletion of a particular construction, a change in the construction plan, a change in the construction method, arising because the Employer deems it necessary for the proper implementation of the Project.

(d) Where a Design Change is necessary pursuant to paragraph (c)(i) above, the Contractor shall, prior to implementing any Design Change, prepare documentation detailing the relevant matters and provide the same to the Employer through the Construction Supervisor. Promptly upon receipt of the Contractor's documentation and notice, the Employer shall determine whether it will implement a Design Change by adopting any one of the following methods and take the necessary measures in respect thereto:

(i) where a Design Change is deemed necessary because of uncertainty or ambiguity in the Design Documents (for example, it is impossible to confirm the construction method or the materials required based only on the Design Documents), the Employer shall determine whether to agree to the Design Change after having confirmed the construction method and materials under the original Design Documents with a designer and having reviewed the unit price calculations or bills of quantity prepared by the Employer;

(ii) where a Design Change is deemed necessary because of any omission or error in the Design Documents, the Employer shall inspect and confirm the existence of such omission or error and supplement (or procure the supplementation of) the Design Documents to secure the functionality and security of the Project and Construction;

(iii) where the Design Drawing and Construction Specification are consistent with each other but a Design Change is deemed necessary because of a discrepancy between the Design Drawing and the Quantity Statement, the Employer shall procure that the Quantity Statement corresponds with the Design Drawing and Construction Specification;

(iv) where there are discrepancies between the Design Drawing and the Construction Specifications and discrepancies between the Quantity Statement and either the Design Drawing or the Construction Specifications, either the Design Drawing or the Construction Specifications shall be confirmed in priority in order to best facilitate the Construction Works and then the Quantity Statement shall be revised in line with the same.

(e) Where a Design Change is deemed necessary pursuant to paragraph (c)(ii) above, the Contractor shall, without delay, prepare documentation detailing how the actual Site conditions differ from those detailed in the Design Documents and notify the Employer of the same via the Construction Supervisor. Upon the receipt of the Contractor's documentation and notice, the Employer shall immediately have the Construction Supervisor check the Site and submit its opinion on whether a Design Change is required and based on the Construction Supervisor's comments, the Employer shall notify the Contractor whether it agrees to a Design Change.

(f) The Contractor shall not implement any Design Change before it receives written instructions to do so from the Employer.

(g) Where a Design Change is deemed necessary pursuant to paragraph (c)(iii) above, the Contractor may, at its own cost and expense, propose to the Employer the following Design Changes (each a "Contractor Design Change Proposal"). Any Contractor Design Change Proposal shall include the Contract Program mentioned in Article 7.3 above updated to reflect the proposed matters, a detailed description of the proposed matters, related calculations and details of how the proposed Design Change will help save construction costs and shorten the construction period and such other matters to be considered.

(i) A Design Change proposal to shorten the overall construction period;

(ii) a Design Change proposal to help reduce construction costs;

(iii) a Design Change proposal that will enhance efficiency and effectiveness for the benefit of the Employer; and

(iv) such other Design Change proposals that are favorable to the Employer.

(h) The Employer shall review the Contractor Design Change Proposal and notify the Contractor of its decision. The right to approve or reject the Contractor Design Change Proposal lies with the Employer.

(i) The Contractor's failure to comply with its obligations hereunder shall, under no circumstances, be deemed to constitute a Design Change and shall not be a cause for adjusting the Contract Price or extending the Completion Deadline. To the extent the Employer incurs costs and expenses as a result of the Contractor's failure to comply with its obligations hereunder, the Employer may claim such costs and expenses from the Contractor and may offset such amounts from the Contract Price.

(j) The Employer shall be entitled to instruct a Design Change and the Contractor must implement such Design Change even if an adjustment to the Contract Price or an extension to the Completion Deadline in respect of such Design Change is not agreed or decided.

A Design Change shall not modify or revise the terms and conditions of this Contract. If a Design Change comprises the exclusion of a part of the Construction from the scope of the Contractor's services hereunder, the Employer shall be entitled to undertake such works itself or through a third party. The Contractor hereby acknowledges and agrees that notwithstanding the foregoing, this Contract as a whole shall remain effective and it will not be considered partially terminated.

Article 11.3 Procedures for Changing the Design

(a) If the Employer instructs a Design Change, the Contractor shall, without delay, submit to the Employer a proposal containing the following:

(i) a construction execution plan that takes into account the Design Change and which includes a construction execution schedule;

(ii) a proposal required to modify the Approved Contract Program and the Completion Deadline under Article 7.3 above.

(iii) details of adjustments required, including to the Contract Price (applying the unit price under the Calculation Statement); and

(iv) such other matters of which the Employer should be informed.

(b) Upon the receipt of the proposal under paragraph (a) above, the Employer shall, without delay, approve or reject the same. The Employer may request that the Contractor supplements the proposal. The Contractor must not delay the Construction Works while it waits for the Employer's decision on its proposals.

(c) Subject to the Employer's decision under paragraph (b) above, the Employer shall issue Design Change instructions in writing. The issuance of such instructions shall not constitute the Employer's consent or agreement to the Contractor's proposal on the adjustment to the Contract Price and/or extension of the Completion Deadline.

(d) Upon a Design Change, the Employer shall consult with the Contractor regarding any adjustment of the Contract Price under Article 11.4 and any extension of the Completion Deadline under Article 7.4.

Article 11.4 Adjustment of the Contract Price

(a) Any adjustment of the Contract Price on account of a Design Change pursuant to Articles 11.2(c)(i), (ii), or (iii) shall be made in accordance with following criteria:

(i) if the quantity of an item or an item of expenditure specified in the Calculation Statement decreases or increases, the Contract unit price shall apply. If, at the time of its tender, the Employer announced an expected unit price, and if the Contract unit price is higher than the expected unit price, the expected unit price shall apply to any increased quantity; and

(ii) the unit price of an item or an item of expenditure not included in the Calculation Statement (includes cases where the items are the same but their functions and specifications are different) shall be the sum of the unit price calculated at the time of the Design Change (being the time the Employer confirms the amended Design Drawings (if changes to the Design Drawings are required) or the time the Parties agree in writing a Design Change (if changes to the Design Drawings are not required)) and the same unit price multiplied by the ratio of the bid price or of the Contract Price (the bid rate) vis-à-vis the expected price.

(b) Any adjustment of the Contract Price on account of a Design Change pursuant to Article 11.2(c)(iv) above and the unit price of any increased quantity of materials or new items of expenditure shall be determined by mutual consultation between the Employer and the Contractor within the range of the unit price calculated at the time of the Design Change and the same unit price multiplied by the bid rate. If the Parties are unable to reach an agreement, the relevant unit price shall be 50/100 of the unit price calculated at the time of Design Change and the said unit price multiplied by the bid rate.

(c) If the Contract Price is paid in multiple currencies, the currency of the Contract Price as adjusted by a Design Change shall be determined in accordance with the currency payment conditions set out in this Contract.

(d) The Employer may instruct a Design Change under the condition of *ex post* settlement and if it does so, the Contractor shall, prior to procuring the requisite materials, provide the Employer a fee quote in respect of the same and when requesting payment, shall provide the Employer with documentary evidence of actual expenditure.

(e) If a Design Change is ordered on the condition that settlement will be *ex post*, the Contractor, when undertaking the relevant Construction Works, shall submit to the

Employer on a daily basis a work statement which shall include the following details:

(i) the name and title of the Contractor's Personnel who has supervised the particular work and the number of hours s/he has worked;

(ii) the type of equipment and materials or items used by the Contractor and the hours of use; and

(iii) the quantity of equipment or materials used.

(f) The Employer shall review the work statement provided in accordance with paragraph (e) above and shall sign and return the same if it determines that the work statement accurately reflects the status quo of the works. When requesting settlement of payment in respect of works completed, the Contractor shall attach the work statements signed by the Employer to its invoice.

Article 11.5 Change in Law

The Contract Price shall not be adjusted notwithstanding any changes in law (including the enactment of new legislation, revisions to existing laws, precedent changes, changes to enforcement ordinances and administrative rules, changes in authoritative interpretations).

Article 11.6 Fluctuations in Price and Exchange Rates

Unless otherwise specified in this Contract, the Contract Price shall not be adjusted for changes in the cost of labor, materials and other items required for the Construction Works during the Contract Period. The Contract Price shall not be adjusted due to exchange rate fluctuations.

Article 11.7 Provisional Sums

(a) Provisional sums may be used, in whole or in part, only under the instructions of the Employer and the Contract Price shall be adjusted according to the use (if any) and records thereof. The total Contract Price paid to the Contractor shall be inclusive of all provisional sums paid at the instructions of the Employer in consideration for the works and/or the services rendered by the Contractor. With respect to the provisional sum, the Employer may instruct the Contractor:

(i) regarding the Construction Works to be undertaken by and/or the services to be rendered by the Contractor;

(ii) to comply with the procedures for changing the Design as set out in Article 11.3 above; and

(iii) to submit details of direct and indirect expenses (including insurance premia, general management expenses, profits) incurred in the implementation of the Construction Works and/or the rendering of the services related to the provisional sum.

(b) Upon the Employer's request, the Contractor shall submit to the Employer proof (including quotations, invoices, transaction details and receipts) of costs of the Construction Works and/or services related to the provisional sum.

Article 12 – Contract Price and Payment Methods

Article 12.1	**Contract Price**
(a)	The Contractor shall be paid the whole of the Contract Price as stated in paragraph 1 of Section B of the Contract Agreement and/or the Detailed Terms and Conditions.
(b)	Unless otherwise specified in this Contract, the Contract Price is inclusive of all taxes, duties and fees, and other expenses, arising in connection with the Contractor's performance of this Contract.
Article 12.2	**Advance Payments**
(a)	If the Employer makes an advance payment in accordance with the Special Conditions, the Contractor shall provide the Employer with a bank guarantee for advance payment. The advance payment made by the Employer is a non-interest-bearing loan and shall be used only for the purpose of performing this Contract.
(b)	The obligation of the Employer to make any advance payment is subject to the Contractor's submission of the following documents as a condition precedent:
	(i) an application for payment of an advance payment; (ii) documentary evidence confirming payment of the Cash Guarantee of the Bank Guarantee for Performance itself; and (iii) a bank guarantee for advance payment (or, if the Employer agrees that it is not possible to have such bank guarantee for advance payment issued, a letter of undertaking from the Contractor covenanting and undertaking to return the advance payment).
(c)	Unless otherwise specified in the Special Conditions, the bank guarantee for advance payment shall be an irrevocable and unconditional marketable security issued by a financial institution approved by the Employer.
(d)	The amount of guarantee stated on the bank guarantee for advance payment must be more than the Employer's advance payment(s) and, unless otherwise specified in the Special Conditions, the bank guarantee for advance payment shall mature on the 60th day from the day following the Completion Deadline. The amount of guarantee stated on the bank guarantee for advance payment may be reduced in proportion to the ratio of progress payments paid up until Completion. If the maturity date is stated on the bank guarantee for advance payment and the guarantee matures prior to the Completion Date, the Contractor shall, by no later than twenty-eight (28) days prior to the maturity date, take measures to extend the maturity period to a time after when Completion is expected to occur. If the maturity date under the bank guarantee for advance payment is to be extended due to reason(s) not attributable to the Contractor, the costs of such extension shall be borne by the Employer.
(e)	Any outstanding amounts of the advance payment shall become immediately due and payable upon the occurrence of a termination event under this Contract and in such case, the Contractor shall immediately repay any outstanding amounts of the advance payment to the Employer.

(f) The Employer shall return the bank guarantee for advance payment to the Contractor within sixty (60) days of the date the taking over certificate for the whole of the Construction is issued, unless paragraph (e) shall apply.

Article 12.3 **Payments for Completed Parts**

(a) The Contractor may deliver to the Employer progress reports containing details of the Construction Works undertaken during each period prescribed in the Detailed Terms and Conditions and seek the settlement of applicable payments related to parts of the Construction Works completed (the "**Applicable Payments**").

(b) The Contractor's request for settlement of an Applicable Payment shall state the following:

(i) the amount of the Applicable Payment the Contractor is seeking and all documents related to any Design Change issued up until the time of the Contractor's request for payment;

(ii) where payment is to be made in consideration for achievement of certain progress rates, confirmation of whether the relevant progress rate has been achieved;

(iii) where the Detailed Terms and Conditions provide for differently with respect to reserves, the total amount of reserves, the total amount of reserves available at the time of the Contractor's request for settlement of the Applicable Payment and the amount to be reserved from the Contractor's request for settlement of the Applicable Payment;

(iv) any amount to be deducted in light of any advance payment amounts repaid; and

(v) any other deductible amounts.

Article 12.4 **Payment of Applicable Payments and Issuance of Confirmation of Payment**

(a) No payment whatsoever shall be made until the Contractor provides the Employer with the Performance Guarantee. Within twenty-eight (28) days of receiving the Contractor's request for settlement of an Applicable Payment with the relevant attachments, the Employer shall issue a confirmation stating the amount of Applicable Payment it determines to be payable. Such confirmation shall also detail the Employer's rationale for the amount of Applicable Payment specified therein.

(b) The Employer shall issue its confirmation unless any of the following events occur:

(i) where there are defects in the Construction Works undertaken by the Contractor or such works are inconsistent with this Contract yet the Contractor fails to take appropriate measures to cure such defects or inconsistencies and such failure results in repair and maintenance costs that exceed the agreed amount of the Applicable Payment;

(ii) where the cost of construction of the non-compliant part of the Construction Works exceeds the agreed amount of the Applicable Payment because the Contractor has failed to comply with its obligations despite the Employer's notice for rectification; or

(iii) where the Contractor has failed to attach the Approved Contract Program and the progress report to its request for settlement of the applicable milestone payment.

(c) Neither the Employer's issuance of its confirmation stating the amount of the Applicable Payment payable nor the Employer's settlement of the Applicable Payment shall constitute confirmation that the Contractor has completed the Construction in accordance with this Contract.

(d) Unless otherwise specified in this Contract, the Employer shall pay the amount stated in the confirmation of the Applicable Payment amount within 30 days from the date the confirmation is issued. If the Employer pays the Applicable Payment amount after the 30-day period lapses, the Employer shall pay the Contractor default interest accruing at the agreed rate on the portion of the Applicable Payment that is late (if there is no agreed rate, the average interest rate for loans granted by Korean financial institutions (which means the loan interest rate applicable to the balance at a deposit bank as published in the Monthly Statistical Bulletin issued by the Bank of Korea) at the time of the relevant payment deadline shall apply).

(e) Unless otherwise agreed by the Parties, the Applicable Payments shall be paid by wire transfer to a bank account designated by the Contractor. Any fees incurred in connection with the wire transfer shall be borne by the Contractor.

(f) The Contractor hereby warrants the payment of remuneration to its workers and the workers of its subcontractors in accordance with this Contract and the Laws.

(g) The Employer may withhold payment of all amounts payable hereunder, including the any Applicable Payments if any of the following occurs:

(i) defects;

(ii) the Contractor fails to provide the Performance Guarantee;

(iii) the Contractor fails to purchase insurance as required under this Contract;

(iv) the Contractor fails to complete the Construction Works by the Completion Deadline and the resultant liquidated damages for such delay are expected to exceed the amount of the Contract Price that remains payable and outstanding;

(v) the Contractor breaches a material term of this Contract;

(vi) the Contractor violates the Laws and loses its qualification as a contractor;

(vii) where there has been an over-payment of the construction costs; or

(viii) where the Parties disagree regarding the milestone payment requested by the Contractor and such disagreement becomes a dispute between the Parties.

Article 12.5 **Payment of Reserves**

(a) If the Detailed Terms and Conditions provide for reserves to be paid, the Employer may waive the requirement under Article 10.2 above for the Contractor to provide a Defect Liability Deposit.

(b) The retention rate of the reserves shall be specified in the Detailed Terms and Conditions.

(c) Unless this Contract provides otherwise in respect of the repayment of reserves, the Employer shall return 50% of the reserves to the Contractor when the inspection process as set out in this Contract completes and a taking over certificate for all of the Construction Works is issued. The remaining 50% of the reserves shall be returned without delay upon expiration of the Defect Notification Period. If there is a part of the Construction Works for which the Contractor remains liable to repair any defects, the Employer shall be entitled to additionally reserve an amount equivalent to the costs required to repair such defects.

Article 12.6 Payment for Completion

(a) Within sixty (60) days from the date the Contractor receives a taking over certificate from the Employer, the Contractor shall, together with supporting documents, submit to the Employer a draft statement of account, which shall include the following details:

(i) details of the Construction Works undertaken by the Contractor and the corresponding amount payable in respect thereto; and

(ii) such other costs for which the Contractor may charge the Employer.

(b) The Employer may reject the draft statement of account submitted by the Contractor and instead request the Contractor to amend or supplement the same, in which case, the Contractor shall amend and supplement the draft statement of account and submit the same to the Employer. Once agreed by the Employer and the Contractor, the draft statement of account shall constitute the "Statement of Accounts".

(c) Where there is a dispute between the Employer and the Contractor regarding the final settlement amount, the Employer may pay only the portion of the final settlement amount which is undisputed between the Parties.

(d) Upon closing of the dispute, the Contractor shall prepare the Statement of Accounts to reflect the results of the closed dispute and submit the same to the Employer.

(e) The Employer shall have twenty-eight (28) days from the date it receives the Statement of Account under paragraph (d) above to sign and deliver the certificate of settlement to the Contractor. The certificate of settlement signed by the Employer shall include the following:

(i) confirmation and acknowledgement that the settlement amount stated therein is the only amount payable by the Employer to the Contractor; and

(ii) confirmation that the settlement amount stated therein is reflective of all of the amount payable by the Contractor to the Employer and vice versa.

(f) If the Contractor fails to request settlement of final payment, the Employer may instruct the Contractor to make its application for such settlement. If the Contractor fails to make its application within twenty-eight (28) days from the date of the Employer's instructions, the Employer may pay the Contractor such final settlement amount as it deems reasonable.

(g) The Employer's payment of the final settlement amount does not constitute and shall not be construed as constituting the Employer's acknowledgement or approval or agreement that the Construction completed by the Contractor have been duly completed in accordance with this Contract.

Article 12.7 Currency of Payment

Unless otherwise specified in this Contract, the Employer shall pay the Contract Price in the currency stated in the Detailed Terms and Conditions. If two or more currencies are stated therein, the following procedures shall apply:

(i) where the Detailed Terms and Conditions only makes reference to the local currency, the Contract Price shall be paid in the local currency by applying the payment ratio and exchange rate of the local currency stated in the Detailed Terms and Conditions and foreign currency. Any adjustment of the Contract Price due to, for example, *ex post* settlement, shall be determined by taking into consideration the payment ratio regarding the Contract Price;

(ii) damages shall be paid by taking into consideration the payment ratio of the local currency stated in the Detailed Terms and Conditions and foreign currency;

(iii) other payments required hereunder shall be paid according to the Parties' agreement; and

(iv) if the Detailed Terms and Conditions do not otherwise provide for the exchange rate, the exchange rate published by the local central bank shall be applicable.

Article 12.8 Inspection of Accounts

(a) The Employer has the right to peruse and inspect all financial documents related to the construction costs and the expenditure thereof. The Employer has the right to demand a refund of any construction costs that are confirmed to have been paid in excess of the terms and conditions of this Contract.

(b) The Contractor hereby acknowledges and agrees that the Employer has the rights specified in paragraph (a) above. The Contractor shall cooperate with the Employer so that the Employer may exercise its rights under paragraph (a) above without hindrance. The Contractor shall grant the Employer access to all documents and materials required for the Employer to exercise the rights specified in paragraph (a) above, and, if necessary, the Contractor shall instruct its attorney, accountant, agent or consultant to cooperate with the Employer.

Article 12.9 Set-off

Unless prohibited by the Laws, the Employer may offset its payables owed to the Contractor against receivables due from the Contractor.

Article 13 – Cancellation or Termination by the Employer

Article 13.1 Notice to Cure

If the Contractor fails to comply with its obligations or only partially complies with its obligations under this Contract, the Employer shall be entitled to notify the Contractor of the same and to request that the Contractor cure the breach by a certain date.

Article 13.2 **Cancellation or Termination by the Employer**

(a) The Employer may terminate this Contract upon the occurrence of any of the following:

(i) if the Contractor fails to provide the Performance Guarantee;

(ii) if the Contractor fails to abide by the cure notice issued under Article 13.1 above within the specified deadline;

(iii) if the Contractor fails to comply with its insurance obligations;

(iv) if the Contractor has indicated its intentions to stop undertaking the Construction Works or to stop performing its obligations hereunder;

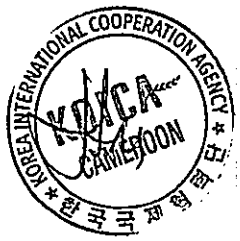
(v) if the Contractor delays in commencing the Construction Works or breaches any of its representations and warranties, without any justifiable cause;

(vi) if the Contractor subcontracts any of its duties hereunder without the prior consent of the Employer;

(vii) if any insolvency or rehabilitation or similar proceedings are commenced against the Contractor;

(viii) if the Contractor has intentionally or by gross negligence submitted guarantees, letters of confirmation, certificates, statements or inspection results that are false;

(ix) if the Contractor has entrusted or delegated its obligations of safety under Article 4.7 to a third party;



(x) if the amount of liquidated damages payable under Article 7.7 exceeds the Performance Guarantee amount;

(xi) if the Construction Works are not completed by the Completion Deadline or they are unlikely to be completed by the Completion Deadline, in each case, due to reasons attributable to the Contractor; or

(xii) if the Contractor breaches a material provision of this Contract, such as the provision relating to the obligation of integrity.

(b) Notwithstanding the Employer's notice of termination to the Contractor, the Employer shall be entitled to exercise all rights prescribed by the Laws and this Contract.

(c) If the Employer delivers a notice of termination in accordance with this Article 13.2, the Contractor shall, without delay, withdraw from the Site, leaving the Contractor Documents and goods that belong to or vest in the Employer at the Site. The Contractor shall use its best effort to:

(i) have all subcontracts assigned; and

(ii) ensure the safety of workers and the preservation without damage of the Construction.

(d) After the termination of this Contract, the Employer may employ a third party to undertake the Construction Works and such third party shall be entitled to use the Contractor's materials and documents.

(e) Upon the Employer's notice to the Contractor of the timing for returning the Contractor's equipment and temporary installations, the Contractor shall, at its own cost and expense, arrange for the return of its equipment and temporary installations. If, at the time of return, any liabilities of the Contractor remain unpaid and outstanding

vis-à-vis the Employer, the Employer may sell the Contractor's equipment and temporary installations and apply the proceeds of such sale to settle such outstanding liabilities. Any amount remaining after such application shall be returned to the Contractor.

Article 13.3 **Settlement and Payment after Termination**

(a) After issuing its notice of termination under Article 13.2, the Employer shall, without delay, appraise the value of the remaining Construction, materials and the Contractor Documents and finally determine the price payable to the Contractor. If the Employer fails to reach an agreement on the settlement amount with the Contractor, the Employer shall pay the Contractor an appropriate settlement amount which shall have been calculated using reasonable methods.

(b) After issuing its notice of termination under Article 13.2, the Employer shall be entitled to:

(i) withhold its payment to the Contractor until the Contractor has fulfilled all of its payment obligations hereunder, including, payments related to repairing any defects, damages, liquidated damages; and

(ii) be compensated by the Contractor for legal costs, service fees, or retainer fees owed to a third party that are incurred subsequently in order to complete the Construction Works or for defect repair costs that are incurred following the notification of termination.

Article 13.4 **Employer's Discretion to Terminate**

(a) The Employer may terminate this Contract without cause, if necessary. The Employer shall notify the Contractor of its intentions to terminate without cause. Such termination of this Contract shall take effect twenty-eight (28) days from the date the Contractor receives the Employer's notice of termination or on the date the Employer returns the Performance Guarantee to the Contractor, whichever occurs earlier.

(b) Upon the termination under paragraph (a) above, Articles 14.3 and 17.5 shall apply.

Article 14 – Suspension of Construction Works and Termination by the Contractor

Article 14.1 **Contractor's Right to Suspend the Construction Works**

(a) If the Employer delays in making payments for sixty (60) days or longer from the relevant due date under Article 12, the Contractor may suspend the Construction Works by giving 21-days' prior notice.

(b) If the Contractor receives payment after suspending the Construction Works under paragraph (a) above, the Contractor shall resume the Construction Works without delay.

Article 14.2 **Termination by the Contractor**

(a) The Contractor may, by giving twenty-eight (28) days' prior notice, terminate this Contract upon the occurrence of the following:

(i) if a Design Change results in at least 40% decrease in the Contract Price; or

(ii) if the suspension period of the Construction Works under Article 7.8 exceeds 100% of the Completion Deadline.

(b) If following the Contractor's notice of termination under paragraph (a) above, the Employer settles payment for the Construction Works within twenty-eight (28) days of the notice or if the order to suspend is lifted, the Contractor shall not be entitled to terminate this Contract hereby.

Article 14.3 Termination and Withdrawal of Equipment

Upon the termination of this Contract pursuant to Articles 13.2, 13.4, 14.2 or 17.5, the Contractor shall, without delay:

(i) suspend all works other than those specifically instructed by the Employer or those affecting human life and property, and safety;

(ii) handover to the Employer all documents, machines, materials, and other works prepared by the Contractor;

(iii) remove and withdraw all goods from the Site other than those items required by the Employer;

(iv) transfer or assign to the Employer all works, machines, materials, and other contracts and rights to the extent legally permitted;

(v) deliver all documents prepared for the benefit of the Employer by the Contractor or its subcontractor; and

(vi) remove all waste.

Article 14.4 Payment after Termination

When termination of this Contract under Article 14.2 takes effect, the Employer shall, without delay, return the Performance Guarantee to the Contractor and make payments in accordance with Article 17.5 hereof.

KOICA CAMEROON

Article 15 – Risks and Liabilities

Article 15.1 Indemnification

(a) In connection with its performance of this Contract, the Contractor hereby indemnifies the Employer and its executives, employees and its agents and representatives from all personal injury and physical damage suffered as a result of the intentional recklessness or negligence of the Contractor, persons (including the Contractor's subcontractors) working under the instructions of the Contractor's Site Manager and agents and representatives of the Contractor. Furthermore, the Contractor hereby indemnifies and holds harmless the Employer and its executives and employees and its agents and

representatives from any third party claims for damages or litigation related to bodily injury, death or property damage. The scope of the Contractor's liability shall include, but not be limited to, the following:

(i) reparation of defects and compliance with obligations prescribed by the Laws;

(ii) bodily injury, disease, death and other personal injury caused by the Construction Works;

(iii) property damage caused by a breach of this Contract or the Laws;

(iv) penalties, fines, surcharges, and other sanctions imposed for a breach of this Contract or the Laws;

(v) damages suffered as a result of a breach of the representations and warranties; and

(vi) infringement of intellectual property rights.

(b) The Contractor shall not agree to any settlement or adjustment for the Employer without the prior consent of the Employer.

(c) The indemnification obligations in this Article 15.1 shall remain effective and survive any expiration, rescission or termination of this Contract.

Article 15.2 Contractor's Obligation to Manage and Supervise

(a) From the Effective Date to the date the taking over certificate for the whole of the Construction is issued, the Contractor shall be responsible for managing and supervising the Site and the Construction Works in accordance with a Site management plan. If a taking over certificate is issued in respect of only a part of the Construction, the Employer shall thereafter be responsible for managing such part of the Construction.

(b) To the extent the Employer becomes responsible for managing certain parts of the Construction in accordance with paragraph (a) above, the Contractor's liability for managing and supervising the Site and the works shall be limited to those parts of the Construction Works not yet constructed.

(c) The Contractor shall be liable for any and all damage or loss to the Construction arising during its management and supervision thereof, irrespective of how they are caused and the Contractor shall be responsible for repairing or providing compensation for such damage or loss.

(d) All liability of the Contractor that accrued prior to the issuance of a taking over certificate shall remain the Contractor's liability notwithstanding the issuance of such taking over certificate.

Article 15.3 Intellectual Property Rights

(a) The term "**infringement**" as used in this Article means an infringement of intellectual property, including patents, registered designs, copyrights, trademarks, and the term "**claim**" as used in this Article means a claim for an infringement of intellectual property rights.

(b) Where intellectual property rights claims regarding the below results in damages for the Contractor, the Employer shall indemnify the Contractor for such damages suffered:

(i) where intellectual property rights are infringed during the Contractor's proper use of the documents provided by the Employer;

(ii) where intellectual property rights are infringed by documents or goods provided by the Employer, which infringement was reasonably foreseeable by the Employer.

(c) Where intellectual property rights claims regarding the below results in damages for the Employer, the Contractor shall indemnify the Employer for such damages suffered:

(i) where intellectual property rights relating to the manufacture, use, sale and importation of materials are infringed; or

(ii) where the claim relates to the Design (including any Design Changes proposed by the Contractor) for which the Contractor is responsible.

(d) If a Party's right of indemnification hereunder is triggered, the indemnifying Party shall engage in negotiations, mediation, litigation or arbitration in respect of the claim to the extent permitted by applicable Laws. The Parties shall cooperate with each other to defend any third-party claim.

(e) The indemnification obligations in this Article 15.3 shall remain effective and survive any expiration, rescission or termination of this Contract.

Article 15.4 Limitation of Liability

(a) Except as otherwise expressly specified in this Contract, no Party shall be liable for indirect or consequential damage suffered by the other Party in connection with this Contract.

(b) The Contractor's liability to the Employer shall not exceed the cap on liability specified in the Detailed Terms and Conditions.

(c) The limitation of liability under paragraph (b) above shall not apply where the Contractor has failed to obtain or maintain insurances under Article 16 or where the Contractor has failed to receive insurance monies because it has negligently undertaken an action that is excluded under its insurance policies.

(d) The limitation of liability provisions under this Article shall not apply in respect of the following:

(i) liquidated damages and where the Contractor has failed a Completion Inspection;

(ii) where payment is withheld or reserved;

(iii) any set-off; and

(iv) any claim in respect of the results of a Completion Inspection.

(e) The limitation of liability provisions under this Article shall not apply to damages caused by or arising out of the Contractor's willful misconduct, gross negligence or fraud.

Article 15.5 **Warranty for the Construction Works**

(a) Regardless of the statements in the documents (including the Design Documents and Construction Specification) provided by the Employer or of the Employer's approval or intention to withhold consent under this Contract, the Contractor hereby warrants that:

(i) the Construction Works will be undertaken by person(s) with the relevant qualifications and sufficient experience in light of the form and shape, size, nature and type of the Project;

(ii) the Construction Works will be undertaken in compliance with all terms and conditions of this Contract (including, terms regarding the Contract Price, the Completion Date, materials and construction methods), and the Construction will be usable and fully operatable as described in the Construction Specification;

(iii) the Construction will be completed in accordance with the Construction Specification;

(iv) the Construction Works will be undertaken in compliance with the highest-level of safety and environmental protection measures as set out in this Contract and applicable Laws;

(v) the construction methods and all equipment, machinery, devices and materials applied to and used for the Construction Works have been technically verified and may be commercially utilized;

(vi) all equipment, machinery, devices and materials used for the Construction Works are new and free of defects and flaws and (even if not expressly provided for in this Contract) of a quality consistent with products that are compliant with internationally accepted good practice principles of the construction industry; and

(vii) the Construction Works will be undertaken in compliance with the Laws and the guidelines and requirements of the relevant Governmental Authorities.

(b) The warranties and obligations in this Article 15.5 shall remain effective and survive any expiration, rescission or termination of this Contract.

KOICA CAMEROON KOREA INTERNATIONAL COOPERATION AGENCY 한국국제협력단

Article 16 – Insurance

Article 16.1 **General Requirements regarding Insurance**

(a) The Employer shall purchase and maintain insurance that meets the insurance conditions set out in the Detailed Terms and Conditions regarding the Employer's Insurance.

(b) The Contractor must purchase insurance that meets the insurance conditions set out in the Detailed Terms and Conditions regarding the Contractor's Insurance and unless

otherwise specified in the Detailed Terms and Conditions, it must maintain such insurance until the date on which a taking over certificate for the whole of the Construction is issued. The Contractor must purchase and maintain insurance prescribed by the relevant Laws and, if necessary, ensure that the scope of its insurances cover its subcontractors as well. Unless otherwise specified in the Detailed Terms and Conditions, the Contractor shall purchase its insurances by the Commencement Date, and the Contractor shall deliver copies of its insurance policies with its Notice of Commencement.

(c) Each Party shall, without delay, notify the other Party upon the occurrence of any of the following:

(i) the cancellation, termination, invalidation or similar of any insurance policy;

(ii) if the insurance company rejects an insurance claim and does not pay out insurance monies;

(iii) if the insurance company, either orally or in writing, claims the invalidity or ineffectiveness of an insurance policy; or

(iv) upon becoming aware of a cause or reason that could invalidate an insurance policy.

(d) Each Party shall notify the other Party of any changes (including the cancellation, termination, invalidation of the policies) to its insurance policies within twenty-eight (28) days of such change coming into effect.

(e) Upon the Employer's request, the Contractor must provide the following information to the Employer's insurers:

(i) all information required by the Employer's insurer in order to analyze the risks under this Contract;

(ii) all information requested by the Employer or the Employer's insurer;

(iii) all information that the Employer's insurer should be aware of or informed of in order to determine the scope of its insurance coverage.

(f) The Contractor must provide all necessary information in a timely manner so that the Employer can properly comply with its notification obligations under its insurance policies.

(g) The Contractor shall notify the Employer of any significant change in its construction methods or the order of construction which may affect the scope of coverage under the insurances. None of the Parties may amend or modify a material term and condition of its insurance policy without the other Party's consent and agreement. If a Party's insurer amends or modifies a term or condition of the insurance policy, the relevant Party shall notify the other Party of the same.

(h) The Contractor shall, with its subcontractors, provide the Employer with all documents and information (including all materials, reports, procedures, progress schedule) required to claim insurance monies.

(i) As soon as practicable, the Contractor shall provide the Employer with evidence that it has purchased requisite insurances and has paid all insurance premia thereon.

(j) The Employer may request that the Contractor provides evidence to verify and confirm that the Contractor has purchased and is maintaining all insurances required under this Contract. If the Employer finds the evidence submitted by the Contractor to be insufficient or unsatisfactory, the Employer shall be entitled to take (at the Contractor's cost and expense) all such measures (including paying premium) necessary to purchase and maintain the insurances.

(k) The Contractor must, without delay, notify the Employer and the insurers upon the occurrence of any of the following:

(i) if there is a risk of loss exceeding the Contractor's out-of-pocket expenses under any of its insurance policies; or

(ii) if it becomes aware that a loss will exceed the Contractor's out-of-pocket expenses under any of its insurance policies.

(l) Any notice provided in accordance with paragraph (k) above shall provide a description of the loss, including details of the nature of the loss, the background or context of the loss, measures to be taken, request for consent from the insurer. The Contractor must notify the Employer whenever there is a change to any part of the description.

(m) The Contractor must obtain the consent of the Employer whenever it undertakes the following actions with its insurer:

(i) where liability is accepted vis-à-vis a third party;

(ii) where the Contractor and the insurer engage in negotiations regarding insurance monies;

(iii) where the Contractor and the insurer come to an agreement regarding insurance monies; or

(iv) upon the initiation of litigation or arbitral proceedings.

(n) When preparing an insurance claim, the Contractor shall keep the Employer apprised of all developments and details and shall obtain the cooperation of the Employer and/or experts.

(o) The Contractor's obligations to insure under this Article 16 shall not be deemed to relieve the Contractor of its obligations under any other provision of this Contract. The Contractor shall remain liable to the Employer for any damages that exceed the insured amount or which are not covered by insurance.

(p) If the Employer ends up making an insurance claim as a result of the Contractor's breach or non-compliance of an obligation under this Contract, the Contractor shall be liable to pay the Employer's expenses under the Employer's insurance policy, including out-of-pocket expenses, fees, and other costs and expenses.

(q) The review, approval and presentation of opinion by the Employer regarding any insurance purchased by the Contractor do not mean a reduction or exemption of the Contractor's obligations, responsibilities, assurances, warranties, covenants, undertakings or liabilities under this Contract. The Contractor hereby acknowledges and warrants that it has reviewed and purchased its insurances having had regard to its adequacy, effectiveness and suitability vis-à-vis this Contract. The Contractor further acknowledges and agrees that the review, approval and presentation of opinion by the Employer regarding the insurance purchased by the Contractor do not mean a

reduction or exemption of the Contractor's obligations, responsibilities, assurances, warranties, covenants, undertakings or liabilities under this Contract.

(r) The provisions of this Article 16 shall remain valid and effective and survive any expiration, rescission or termination of this Contract.

Article 17 – Force Majeure

Article 17.1 Force Majeure Event

(a) For the purposes of this Article 17, a "**Force Majeure Event**" shall mean an event or circumstance that satisfies each of the conditions below:

(i) the event or circumstance must have been beyond the reasonable control of the Parties;

(ii) the event or circumstance was not known or reasonably foreseeable prior to or at the time of concluding this Contract;

(iii) the event or circumstance, at the time of occurrence, could not be avoided or overcome with the reasonable efforts of the affected Party; and

(iv) the cause of the event or circumstance is not attributable to any Party.

(b) A "**Force Majeure Event**" shall mean any of the following events; provided that the conditions set out in paragraph (a) are all satisfied:

(i) war, foreign or enemy invasion;

(ii) uprising, terror, revolution, riot, military action or usurpation or civil war;

(iii) violence, strike or lockouts by persons other than the Contractor's personnel (which includes its subcontractors);

(iv) explosions, radioactive lakes or contamination the causes of which are not attributable to the Contractor; or

(v) nationwide natural disasters and bad weather, including earthquakes, hurricanes, typhoons, tsunamis and volcanic eruptions.

Article 17.2 Notice of a Force Majeure Event

(a) A Party affected by a Force Majeure Event (an "**Affected Party**") shall, without delay, on the day it is affected by or becomes aware of the Force Majeure Event and in any case by no later than seven (7) days of the event notify the other Party of the event and confirm which of its obligations hereunder it is unable to comply with as a result of such event. If the Force Majeure Event is such that even notification is impossible, the affected Party shall provide notice within three (3) days from the date notification becomes possible.

(b) Regardless of the notice delivered under paragraph (a) above, the Affected Party shall continue to comply with all other obligations hereunder other than the obligation(s) of which it has notified as being affected by the Force Majeure Event.

(c) No Force Majeure Event shall affect the Parties' payment obligations owed to each other under this Contract.

(d) Under no circumstance will a Force Majeure Event be construed as reducing a Party's obligations or alleviating a Party from its obligations hereunder.

Article 17.3 Duty to Minimize Delay

(a) The Parties shall use their reasonable efforts to overcome or minimize any delays to the implementation of the Contract caused by a Force Majeure Event.

(b) An Affected Party who has suspended the Construction Works as a result of any Force Majeure Event shall notify the other Party of the same by no later than seven (7) days from the date of such suspension.

Article 17.4 Consequences of a Force Majeure Event

(a) Where the Contractor is the Affected Party, the Contractor must notify the Employer in accordance with Article 17.2 above. With respect to any delay caused by a Force Majeure Event, the Contractor may request an extension to the Completion Deadline in accordance with Article 18.1 below.

(b) Upon receipt of the Contractor's notice pursuant to Article 17.2, the Employer shall consult with the Contractor regarding an extension to the Completion Deadline. If the Parties are unable to agree on the issue, the Employer, shall in its reasonable discretion, decide whether to extend the Completion Deadline and for how long.

(c) The Contractor shall not be able to assert its rights hereunder differently on the basis that the definition or scope of force majeure, the conditions for extending the completion deadline or payment conditions are wider in any of its subcontracts relating to this Contract, and such difference shall not, in any way, relieve the Contractor of its obligations hereunder or reduce the Contractor's obligations under this Contract.

Article 17.5 Termination for a Force Majeure Event

(a) If the Force Majeure Event continues for 84 consecutive days without insurance coverage making it practically impossible for the Construction Works to be undertaken, the Employer may terminate this Contract by notice to the Contractor. Termination shall become effective seven (7) days after the termination notice reaches the Contractor. In such case, the Contractor shall comply with the procedures set out in Article 14.3 above.

(b) The termination of notice delivered by the Employer in accordance with paragraph (a) above, shall include details of the Construction Works completed by the termination date and the amount to be paid to the Contractor in respect thereof, each as determined by the Employer. The payment to be made to the Contractor shall be determined having regard to the following:

(i) the value of the work undertaken by the Contractor based on the Contract Price and the amount to be paid to the Contractor (excluding any amounts the Employer is entitled to offset or reserve in accordance with the terms hereof);

(ii) the cost of machinery or materials brought onto the Site by the Contractor or the cost of machinery or materials to be received by the Contractor for the benefit of the Employer (considered to be assets of the Employer at the time of payment);

(iii) other costs and expense reasonably expended in anticipation of completion of the Construction; and

(iv) reasonable expenses to be incurred in order to return the employees and workers of the Contractor to their pre-deployment locations following termination of this Contract.

Article 18 – Claims, Disputes and Arbitration

Article 18.1 Claims by the Contractor

(a) If the Contractor determines that it has a right to claim an extension of the Completion Deadline or additional costs or such other relief of its obligations under this Contract, it must notify the Employer of its claim, which notice shall include details of the basis of its claim, the relevant provisions of this Contract and details of the claim itself. The Contractor shall notify the Employer without delay on the date on which the cause for the claim arises or on the date the Contractor knew or should have known of such claim and such notice must reach the Employer by no later than twenty-eight (28) days of such date.

(b) Should the Contractor fail to give its notice under paragraph (a) above or neglect to notify the Employer, in each case, within the prescribed timeframe, the Contractor shall no longer be entitled to make a claim against the Employer regarding the relevant matter and the Contractor shall be deemed to have waived any rights of claim in respect thereof. The Employer shall not be liable (including to extend the Completion Deadline or adjust the Contract Price) for any claims not notified by the Contractor.

(c) Even if it is difficult to determine the specific impact an event giving rise to a claim may have on an extension of the Completion Deadline, additional costs or the Contractor's obligations or even if the outcome of the event is unknown because the event is ongoing, the Contractor must notify the Employer of its potential claim within twenty-eight (28) days of the date on which the event occurred or on which the Contractor should have known it occurred. Thereafter, the Contractor must provide detailed updates to the Employer every 30 days and must deliver its final notice within twenty-eight (28) days of when the impact of the event becomes conclusive.

(d) Should the Contractor fail to give interim notices under paragraph (c) above or neglect to notify the Employer, in each case, within the prescribed timeframe, the Contractor shall no longer be entitled to make a claim against the Employer regarding the relevant matter and the Contractor shall be deemed to have waived any rights of claim in respect thereof. The Employer shall not be liable for any claims not notified by the Contractor, including extension of the Completion Deadline or adjustment of the Contract Price.

(e) The Contractor shall retain all documents necessary to evidence its claim and if requested by the Employer, submit the same to the Employer or allow the Employer to access such documents. Upon receipt of the Contractor's notice in accordance with Article 18.1, the Employer may provide to the Contractor its opinions on the preservation of documents or the required documents. The Employer's expression of

opinion hereby does not mean and shall not be construed as the Employer's acceptance or agreement to the Contractor's claim and shall not reduce the Contractor's obligations hereunder or alleviate the Contractor of its obligations under this Article 18.1.

(f) Within forty-two (42) days of its notice of claim under Article 18.1, the Contractor must deliver to the Employer claim documents that include the following details:

(i) reasons for the claim and background;

(ii) legal and contractual basis for the claim;

(iii) date and type of delay;

(iv) cause of additional fees incurred and scope thereof;

(v) details of actions and measures taken by the Contractor to minimize and mitigate the impact;

(vi) effect on the core process set out in the Contract Program;

(vii) matters concerning the extension and modification of the Completion Deadline;

(viii) matters concerning adjustments to the Contract Price; and

(ix) confirmation that the document submitted in accordance with this paragraph (f) relates to the claim notice submitted under Article 18.1.

(g) Should the Contractor fail to attach evidence proving the details in the documents listed in paragraph (f) above or fail to deliver the same within the prescribed timeframe or neglect to submit such evidence, the Contractor shall no longer be entitled to make a claim against the Employer regarding the relevant matter and the Contractor shall be deemed to have waived any rights of claim in respect thereof. The Employer shall not be liable (including to extend the Completion Deadline or adjust the Contract Price) for any claims not notified by the Contractor.

(h) The Employer shall confirm its acceptance, rejection or such other opinion regarding the Contractor's claim within 42 days of receipt of the claim documents listed in paragraph (f) above. The Employer shall be entitled to request additional documents, information and materials from the Contractor.

(i) Any extension of the Completion Deadline and the number of days of any extension shall be determined at the sole discretion of the Employer who shall exercise such discretion reasonably. The Employer shall not be obligated to approve any extension to the Completion Deadline as requested by the Contractor.

(j) A failure by the Employer to come to a decision regarding the Contractor's claim within the prescribed period shall not be construed as an exemption to, waiver of or limitation regarding its right to liquidated damages or as reducing or alleviating the Contractor of its obligations.

(k) If a delay to the completion of the Project is a result of multiple, overlapping causes, the period of delay which is attributable to the Contractor shall be excluded (deducted) when determining the number of days of extension of the Completion Deadline.

(l) With respect to any delay not attributable to the Contractor, an extension to the Completion Deadline shall be the only remedy and unless special circumstances exist, the Contractor shall not be entitled to claim any other remedy for any delay in the Construction Works. Notwithstanding the foregoing, if it is clear that the delay to the Construction Works is not attributable to the Contractor and the loss to the Contractor is not small, the Employer may consider an adjustment of the Contract Price on the

condition that the Contractor will provide documentary evidence to evidence the amount of loss suffered.

(m) The Contractor must use its best efforts to minimize and mitigate the occurrence of any delays to the Construction Works and the incurrence of any additional costs and expense.

Article 18.2 **Mediation of Disputes and Differences of Opinions**

All disputes arising in connection with this Contract must be resolved in accordance with Article 18.3. The Parties shall use their best efforts to amicably settle any disputes.

Article 18.3 **Procedures for Dispute Resolution**

(a) In the event of a dispute, the claiming Party shall notify the other Party of the occurrence of a dispute and such notice shall include the following details:

(i) legal and contractual basis for the claim;

(ii) the facts of the claim;

(iii) related documents and background information/materials; and

(iv) the basis for calculation of the claim amount.

(b) If the Parties are unable to resolve the dispute within sixty (60) days of the notice delivered under paragraph (a) above, a Party may refer the dispute to the Korean Commercial Arbitration Board for settlement by arbitration in accordance with the International Arbitration Rules of the Korean Commercial Arbitration Board.

(i) Unless otherwise specified in the Detailed Terms and Conditions, the seat or legal place of the arbitral proceedings shall be Seoul, Republic of Korea and the venue for the arbitral proceedings shall be the offices of the Korean Commercial Arbitration Board.

(ii) The language to be used in the arbitral proceedings shall be English, unless the Contractor has an office in Korea, in which case the language to be used shall be Korean.

(iii) The number of arbitrators and the process for appointing them shall be agreed by the Parties. If the Parties are unable to reach an agreement, the arbitrators shall be appointed in accordance with the Arbitration Act of Korea.

(iv) The Parties agree that an arbitral award will be final and binding upon the Parties and shall be the sole and exclusive remedy between such Parties to the dispute.

(c) The results of the arbitration shall be kept confidential in accordance with Article 1.8 hereof.

(d) Notwithstanding paragraphs (a) through (c), the Parties may separately agree to resolve any dispute through the courts in Korea. Any agreement to do so must be in writing by the Parties.

Article 18.4 **Dispute Resolution Procedures and Construction Works**

	The procedures for dispute resolution set out in Article 18.3 shall not affect the Construction Works or the undertaking thereof.
Article 18.5	**Survival of Article 18**
	The provisions of this Article 18 shall remain valid and effective and survive any expiration, rescission or termination of this Contract.

Article 19 – Miscellaneous

(a)	Unless otherwise specified in the Detailed Terms and Conditions, the governing law of this Contract shall be Korea if the Contractor is a citizen or a corporation incorporated in Korea; if not, the governing law shall be the laws of the relevant Recipient Country.
(b)	The Contractor acknowledges that the import and custom Laws of the Recipient Country will be applicable to all materials, equipment and components it imports to undertake the Construction Works. Further, the Contractor acknowledges that the import and custom Laws of the Recipient Country may include regulations on import permits and hereby confirms that it has fully reviewed and is fully aware of such possibility.
(c)	This Contract may be amended, supplemented, modified only in writing with the signature of the authorised signatory(ies) of each Party.
(d)	Unless otherwise expressly provided for in this Contract, all guarantees, warranties, obligations, liabilities under this Contract shall remain valid and effective and survive any termination, expiration, rescission of this Contract.

[Attachment]

SPECIAL TERMS AND CONDITIONS OF INTEGRITY PLEDGE

Article 1 (Purpose)

The purpose of these Special Terms and Conditions of Integrity Pledge is to specify matters necessary for the integrity pledge to be incorporated into the general terms and conditions of the contracts for purchase of goods, services, and construction (the "**Contract**") entered into by and between the employee in charge of contracting in the Korea International Cooperation Agency (hereinafter, "**KOICA**") and the other party to the Contract.

Article 2 (Obligation to Comply with Integrity Pledge)

(1) Pursuant to the Employee Code of Conduct of KOICA, KOICA's employees related to contracting (e.g., employees in charge of contracting, supervisors, etc.) shall strictly manage and supervise bidding for, and execution and performance of, the Contract so as to ensure that such contracting procedures will be carried out in a fair and transparent manner in accordance with the procedures provided by applicable laws, and shall neither abuse their dominant position in a transaction to demand or receive any unfair profits such as any forms of money and valuables and/or entertainment, etc. **(including illegal offering of a job position to relatives, etc.)** nor make an unjust demand such as coercing unfair transaction conditions or intervening in business management, etc. Any employee who violates this provision shall take responsibility, being subject to disciplinary measures, etc., in accordance with applicable laws and regulations.

(2) The employees, executives, and agents of all entities (institutions) which participate in the procedures of bidding, winning a bid, and/or execution and performance of the Contract shall neither engage in any unfair trade practices such as a cartel, etc. in the foregoing procedures nor provide any unfair profits such as money and valuables and/or entertainment, etc. **(including illegal offering of a job position to relatives, etc.)** to the related employees and the foreign public officials, etc. as defined in the *Act on Combating Bribery of Foreign Public Officials in International Business Transactions* (hereinafter "**Foreign Public Officials**") and shall submit a "Letter of Undertaking of Integrity" which accepts these Special Terms and Conditions of Integrity Pledge, which provide for the restrictions on qualification for participation in bidding and termination of the Contract, etc., in the case of violation of this provision.

(3) An entity which submits an application for bidding or enters into the Contract through the KOICA E-procurement System shall affix the electronic signature on the "Letter of Undertaking of Integrity" on the electronic system, and an entity which submits an application for bidding and enters into the Contract by a non-electronic means shall separately submit to KOICA the "Letter of Undertaking of Integrity (Attachment Form No. 1)" signed by the representative of such entity, which shall constitute part of the Contract.

Article 3 (Restricting Unjust Enterprises from Participating in Bidding and Payment of Security for Tender)

(1) If a bid participant is found to have engaged in an unfair trade practice such as a cartel, etc. to manipulate the bidding price or award the bid to a certain person, such participant shall be subject to the restriction on participating in bidding as follows:

1. A person who participates in a competitive bidding process and takes the lead in bid rigging for a specific person to be the winning bidder shall not participate in bidding for two (2) years from the date of imposition of the restriction on bidding participation; and

2. A person who participates in a competitive bidding process and engages in price rigging through prior mutual consultation of the bidding price or engaged in bid rigging for a specific person to be the winning bidder shall not participate in bidding for one (1) year from the date of imposition of the restriction on bidding participation.

(2) In the case a bid participant has engaged in any unfair trade practices including bid rigging, it shall not raise any objection to KOICA's measures including filing a complaint with the Korea Fair Trade Commission in accordance with the *Monopoly Regulation and Fair Trade Act*, in addition to the restrictions specified in Paragraph (1) above.

(3) Any person who provides bribes to related employees and/or Foreign Public Officials in the procedures of bidding, winning a bid, and execution and performance of the Contract may be subject to following sanctions:

1. To be restricted from participating in bidding for a period one (1) year or more and not more than two (2) years from the date of imposition of the restriction on bidding participation;

2. To be excluded from the list of entities exempted from payment of security for the tender as specified in Article 36 of the *KOICA Regulations on Procurement and Contracting in Respect of the Foreign Grant Assistance Program* with respect to the bidding held by KOICA for the period of two (2) years from the expiration of the period of restriction on bidding participation; and

3. To notify to judicial authorities and the Public Procurement Service of the foregoing sanctions.

(4) Any person who receives the imposition of restriction on bidding participation in accordance with the provisions in Paragraphs (1) through (3) above shall neither raise a claim for damages nor file a civil or criminal action with respect to any bidding from which such person is excluded.

Article 4 (Termination, etc.)

(1) Any person who provides bribes to related employees and/or Foreign Public Officials in relation to bidding, winning a bid, contract negotiation, and execution and performance of the Contract shall receive any of the following measures with respect to the related contract:

1. The Contract shall be rescinded if the bribery is found after the Contract has been executed but before the commencement of the project; *provided that* this provision may not apply if it is unavoidable to implement the project; or

2. The Contract shall be rescinded or terminated in whole or in part if the bribery is found after performance of the Contract; *provided that* this provision may not apply if it is unavoidable to implement the project in consideration of the characteristics, progress rate, project scale, and the performance period of the project under the Contract.

(2) The other Party shall not raise any objection, whether civil or criminal, with respect to KOICA's measures in accordance with Subparagraphs 1 and 2 above.

Article 5 (Miscellaneous)

The other Party shall proactively endeavor to establish a code of conduct under which its executives and employees (including its subcontractors) and its agents are prohibited from providing bribes to the related employee or Foreign Public Officials or engaging in unfair trade practices such as forming a cartel, etc. and a bylaw which prohibits any unfavorable treatment against the whistleblowers who have reported misconduct.

[Attachment Form No.1] Letter of Undertaking of Integrity

LETTER OF UNDERTAKING OF INTEGRITY

☐ Contract Name: Above-captioned Construction Contract

With respect to the participation of the above-captioned Construction Contract, our Company, including its executives and employees and its agents, undertakes as follows:

1. We will not engage in any unfair trade practices which unjustly impede free competition in bidding through engaging in collusion or agreements with other companies with the intent to maintain the bid price or award the bid to a certain person.

2. We sufficiently understand and will strictly abide by the provisions of the *Act on Combating Bribery of Foreign Public Officials in International Business Transactions* (Established as Act No. 5588; promulgated on December 28, 1998).

3. We will endeavor to establish a code of conduct under which our executives and employees shall be prohibited from engaging in any unfair trade practices including forming a cartel or offering a bribe (including but not limited to money/valuables and illegal offering of a job position to relatives, etc.) to the KOICA employees in charge of contracting and Foreign Public Officials and a bylaw which prohibits any unfavorable treatment against the whistleblowers who have reported misconduct.

4. We will not raise an objection against KOICA's following measures if it is found that we have engaged in any unfair trade practices and/or bribery:

   A. We will be restricted from participating in bidding;
   B. KOICA will notify judicial authorities and the Public Procurement Service of the issues;
   C. We will be excluded from the list of entities exempted from payment of security for the tender;
   D. The decision to award the bid will be cancelled; and
   E. The related Contract will be cancelled; the said Contract will be terminated or rescinded in whole or in part.

[Date]

Company Name:

Representative: (seal)

To: Korea International Cooperation Agency

[Attachment Form No. 1-2] Integrity Pledge

Integrity Pledge

In participating in any bids/contracts for construction, goods and/or services invited/ordered by KOICA, the Company/I (i.e., the representative director/agent), the undersigned, and its executives and/or employees, and its subcontractors and their executives and employees (including those who, either directly or indirectly, carry out business with the subcontractors), do hereby undertake the following pursuant to Article 5-2 (Integrity Agreement) of the *Act on Contracts to which the State is A Party*, with deep understanding that "corruption-free and transparent corporate management and fair administration" is the key to the development of society and national competitiveness, and in recognition of stricter enforcement of the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions and sanctions against corrupt companies and nations:

1. The Company/I will not engage in any unfair trade practices which unjustly impede free competition in bidding (contracting) through engaging in any collusion, arrangement, resolution, or agreement with other companies with the intent to maintain the bid price or award the bid to a certain person.

   - If the Company/I violate(s) the foregoing, the Company/I will not raise any objection against the restriction on participating in bidding to the Company/me as the bidder who engages in unfair trade practices in accordance with the *Enforcement Decree of the Act on Contracts to which the State is A Party*, and if it is found that the Company/I has/have been engaging in unfair trade practices such as forming a cartel, the Company/I will not raise any objection to KOICA's complaint submitted to the Korea Fair Trade Commission (KFTC) and subsequent administrative fines imposed by KFTC.

2. The Company/I will not, directly or indirectly, offer any unfair profits such as money and valuables and/or entertainment, etc. (including illegal offering of a job position to relatives, etc.) to the related executives, employees, etc. in the procedures of bidding, winning a bid, contract execution and performing the terms of the contract (including after the construction completion).

   - If it is found that the Company/I has/have been favored in bidding and consequently entered into the contract through provision of money and valuables and/or entertainment, etc. (including illegal offering of a job position to relatives, etc.) to the related executives and employees in connection with bidding, and execution and/or performance of the contract in breach of the above, or to have received accommodation and, as a result, poorly carried out construction or manufacture during the procedures of performance of a contract, the Company/I will receive the restriction on bid participation as the bidder who engages in unfair trade practices in accordance with the *Enforcement Decree of the Act on Contracts to which the State is A Party*.

   - If it is found that the Company/I has/have provided money and valuables and/or entertainment, etc.(including illegal offering of a job position to relatives, etc.) to the related executives and employees for the purpose of making the bidding and contract terms favorable to the bidder and/or bid-winner (i.e., the contractor) or making the performance of the contract be of bad quality, the Company/I will receive the restriction on bid participation as the bidder who engages in unfair trade practices in accordance with the *Enforcement Decree of the Act on Contracts to which the State is A Party*.

   - If it is found that the Company/I has/have provided money and valuables and/or entertainment, etc. (including illegal offering of a job position to relatives, etc.) to the related executives and employees in connection with bidding, and execution and/or performance of the contract, the Company/I will receive the restriction on bid participation as the bidder who engages in unfair trade practices in accordance with the *Enforcement Decree of the Act on Contracts to which the State is A Party*.

3. If it is found that the Company/I has/have provided money and valuables and/or entertainment, etc. (including illegal offering of a job position to relatives, etc.) to the related executives and employees in connection with bidding, winning a bid, and execution and/or performance of the contract, the Company/I will accept the cancellation of the decision to designate the successful bidder (if it is before execution of the contract), the cancellation of the contract (if it is before performance of the contract), and the termination/rescission of the contract in whole or in part (including compensation for any damages caused thereby) (if it is after the performance of the contract), and will not raise any objection, whether civil or criminal.

4. If the Company/I violate(s) Paragraph (1) 2 (Matters Related to the Prohibition of any Acts Impeding Fair Competition Such as Engaging in Prior Consultation Regarding the Bidding Price or Forming a Cartel for Awarding Bid to Certain Person) of Article 4-2 (Terms and Conditions of Integrity Agreement and Execution Procedure) of the *Enforcement Decree of the Act on Contracts to which the State is A Party*, it/I will pay for damages as follows:

- Bidder: 5/100 of the bidding price; and

- The Other Party to the Contract: 10/100 of the contract price

The Company/I hereby will undertake to comply with this Integrity Pledge at all costs as a pledge based on mutual trust; to perform the substance of this Integrity Pledge as it is as the special terms and conditions of the contract upon being selected as the winner (contractor); not to file any claim for damages against KOICA with respect to any measures taken by KOICA including restriction on bidding participation and/or termination of the contract; and not to raise any objection against KOICA, whether civil or criminal, with respect to any bidding from which the Company is excluded.

[date]

Pledger: (Company Name) (Name) Representative (seal)

To the President of Korea International Cooperation Agency

KOICA
Korea International
Cooperation Agency

CURY

Yaounde Emergency Center

REFURBISHMENT PROJECT OF YAOUNDE EMERGENCY CENTER

100%
TECHNICAL SPECIFICATIONS

CONTENT

DIVISION 0: INTRODUCTION

The present technical specification is done to describe the work that is needed for the refurbishment of the Yaoundé Emergency Center. All task carried out shall comply to the present technical SPECS and in accordance to the descriptions given in the bill of quantities also attached. The contractor shall be considered to have read this document and agree to the terms of this present technical specifications.

0.1 BRIEF DESCRIPTION OF THE PROJECT

The Yaoundé Emergency Center CURY expressed an interest to undertake refurbishment works in the entire Center. The project consist of refurbishment works that is to be carried out in the main structure and other new auxiliary structures at the compound space of the center.

The project will provide various functions as follows

- Complete refurbishment of the main structure of the building in accordance to designs and SPECS attached
- Construction of a waiting area to host visitors at the west wing of the main structure
- Refurbishment works of the water tank and installation of new boaster bumps
- Construction of a new external toilet
- Refurbishment of the Generator House roof
- Refurbishment of the Incinerator room
- Refurbishment of the gas station
- Refurbishment of the Laundry

0.2 SITE DESCRIPTION

The site is located at the MESSA neighborhood at the heart of the City of Yaoundé in Cameroon.

0.3 CLIMATE

Yaounde is in the tropical zone and has a warm and dry climate for most part of the year with intermittent rainy seasons.

0.4 QUALITY ASSURANCE

0.4.1. SUBMITTALS AND SUBSTITUTIONS

The minimum acceptable qualities of materials and workmanship have been established in this Specification. In each section requirements have been established for the advance submittal of data for review and approval.

In case the remark 'or similar manufacturer, to be approved by the project manager is added, the contractor is authorized to propose an equal product to be approved by the project manager. The specified product is used as an atheistically and technical reference for the possible alternative to be proposed.

0.4.2. CODES AND STANDARDS

A list of Codes and Standards referred to in this Specification is given in individual sections of this document. The whole of the design, materials, equipment, methods of construction and installation shall conform to the applicable standards.

Should there be any conflict between the Codes or Standards indicated, the more stringent Code or Standard shall govern.

Where a Code or Standard is referred to, that shall be the latest published edition thereof, unless otherwise stated. The use of other acceptable equivalent proved standards being used for the works requires the written approval of the Project manager.

0.4.3. RELATED WORKS DESCRIBED ELSEWHERE

The Technical Specification has been divided into Divisions. In dealing with a division, works that are necessarily related to the division under consideration, but not included in that particular division are referred to under "Related Works Described Elsewhere". The reference to the works described elsewhere shall be considered as if the works have been described in that particular division and equally applicable as far as the work is related.

0.4.4. DRAWINGS

The drawings which form part of this Specification have been listed in Annex attached.

0.4.5 ABBREVIATION AND NOTATION

The following abbreviations and notations are used throughout this Specification. The abbreviations and notations shall be understood as having the meanings as given to them hereunder.

- BaTCoDA Building and Transport Construction Design Authority
- BS EN European Code of Practice
- BS British Standard
- CP British Standard Code of Practice
- AS American Standard
- ASTM American Society for Testing and Materials
- AASHO American Association of State Highway officials

0.4.6. UNITS

In these Documents the metric system of measurement has been adopted and shall be used for the execution of the Works.

The international Code ISO 1000 "SI units and recommendations for the use of their multiples and of certain other units" issued by the International Organization for Standardization (ISO) is applicable.

0.4.7. LEVEL

The datum level is as indicated on the drawing of the Site. All levels are to be correlated to the datum level on site.

0.4.8. SURVEY OF ADJACENT STRUCTURES

Prior to the start of the execution of the Works a survey shall be executed - arranged by the Contractor - showing the condition of the existing and adjacent structures. The location of any defect found shall be determined and described and where applicable photographs are to be taken. The result is to be presented to the project manager in duplicate.

0.4.9. GUARANTEE FOR PARTS OF THE WORKS

The guarantees shall include:

- Guarantee on the materials used;
- Guarantee on the way of application;
- Other factors determining the quality such as property, suitability, durability, solidity and reliability.

The guarantee starts on the day of the issue of the Taking-Over Certificate till the end of the indicated period of the guarantee.

0.4.10. CONDITIONS OF GUARANTEE

The Contractor shall provide a Certificate of Guarantee for those parts of the works for which a guarantee is required. The Certificates of Guarantee shall be submitted to the project manager, prior to the handing over of the works.

The following conditions are applicable:

- The Certificate of Guarantee shall be in accordance with the standard condition of contract, the text extended where required and be printed on paper provided with the logo of the guarantor.
- The guarantee shall be provided by the Contractor.
- In case the Certificate of Guarantee as indicated above not has been provided shall this never result in a cancellation or change of the obligations of the Contractor with regard to the guarantee to be provided.

In case - to the opinion of the client- the guarantor does not fulfil his obligations regarding the guarantee shall the client be entitled to have required repairs in relation to the guarantee be executed by third parties, at the Contractor's expense. Also, in this situation shall this never result in a cancellation or change of the obligations of the Contractor regarding the guarantee to be provided.

0.5 UNIT PRICE:

Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work required by the Contract Documents are increased or decreased.

The present contract is a measurement contract meaning quantities paid for the same unit price is the actual quantity executed in the field. In a case where quantity executed is more or less, the BOQ shall be revised for this purpose in accordance to the terms of the contract.

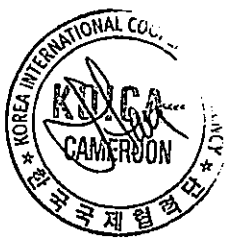
0.6 REQUEST FOR INFORMATION (RFI):

In a case where the technical documents are not clear in particular places (that is dimensions etc.). Contractor shall address a request for information to the Consultant.

0.7 ACTION SUBMITTALS:

An action Submittal is a document written by the Contractor to the consultant prior to the execution of a given task:

- Describing contractor's choice of materials
- Giving shop drawings of the work to be carried out,
- Giving proposals of any changes from technical documents that does not affect cost
- Giving photograph and samples of materials to be employed
- Etc.



0.8 METHOD STATEMENT

A method statement is a document submitted prior to construction that describe the methodology for the execution of given tasks.

0.9 INFORMATION SUBMITTAL

An information submittal is a document that is written prior to construction that gives all relevant information about the task to be carried out. That is, certification of subcontractors, qualification of workers, product data sheets etc.

DIVISION 1: INTERNAL TOILETS

1.1 ARCHITECTURE AND CIVIL WORKS FOR INTERNAL TOILETS

1.1.1 SUMARY

Section includes:

- Removal of existing plumbing and sanitary equipment
- Removal of existing Floor Tiles
- Removal of existing Wall tiles and sanding of wall surface
- Casting of a new screed
- Waterproofing of floor and walls up to a height of 1.80 m in shower cabinets and 1.2 m in other toilet location
- Placing of floor tiles on waterproofed surface
- Placing of wall tiles on water proof surface to the door height
- Removal and replacement of damaged doors to include all locking mechanism and every necessary accessories
- Hack out existing paint, sand and repaint all non-tiled surfaces on wall and ceiling

1.1.2 DEMOLISION

A. Unless otherwise indicated, all equipment issuing out from demolition primarily belong to the owner. However, contractor and consultant will verify which of the equipment are still in good condition to be reused in the project.
B. All debris issuing out from demolition belongs to the contractor and shall be evacuated to a chosen location taken into account the waste disposal laws applicable in the republic of Cameroon.
C. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
D. Carefully salvage in a manner to prevent damage and promptly return to Owner or re-employ in the project as per the consultant's prescriptions.
E. In the case where the item is re-employ in the project as per the consultants evaluation, item shall be deducted from the Supply and install list from the BOQ and only the amount for installation paid for.

1.1.3 CAST A NEW SCREED ON THE FLOOR

A. A rich cement grout of type SIKAGROUT or equivalent as validated by the consultant through a submittal note to be used to seal critical zones for leakage on the slab after demolition; most especially areas where old plumbing pipes have been removed and also around the boarders of new drainage pipes installed through slab.
B. A well-mixed cement screed with cement as validated through a submittal note casted on the entire floor of the toilets with a thickness of at least 5 cm. Screed shall be mixed with a mixture of 350 kg/m^3 of sand. A hydraulic cement binder additive required as validated by a submittal note to make screed water proofed.
C. Surface shall be allowed over a period of at least 1 week to set and also dry before any further work.

1.1.4 WATER PROOFING OF FLOOR AND WALLS

A. A suitable resinous waterproofing product shall be chosen by the contractor and validated by the consultant through a submittal note.

B. Surface shall be verified to be dry with a moisture content of less than 5%. For this therefore 1.1.3.C must be carefully respected.
C. All the technical data sheet specifying the method of application of the product must be respected.
D. A specialist certified for the application of the given product must be used to apply the product.

1.1.5. FLOOR AND WALL TILES

A. Choice of 1st grade tiles (type and color) by the contractor and validated by the consultant through a submittal note.
B. Type of cement glue carefully chosen and validated by the consultant. Cement glue should have water proofing properties or better still include a hydraulic cement additive.
C. Tiles shall be placed only after the waterproofing has been allow to dry for at least 24 hours
D. Tile joints shall be sealed with water proofed joint sealants as validated by the consultant.
E. All necessary metal edge stripes and joint covers must be used to differentiate different tile transition patens and material.

1.1.6. REPLACE DAMAGE DOOR PANNELS

A. Unless otherwise indicated, all doors issuing out from removal primary belong to the owner. However, contractor and consultant will verify which of the doors are still in good condition to be reused in the project.
B. All necessary locking mechanism shall be validated by the consultant prior to installation.

1.1.7. REPAINTING OF NON TILED SURFACES

A. Hack out all surfaces and sand to smoothen the surface before application.
B. All water traces on the ceiling and walls should be carefully treated as in before painting
C. Painting shall be applied according to the requirements of Division 9 of this SPECS

1.1.8. PREINSTALLATION MEETINGS

A. Pre-installation meeting must be held and works plan together with the owner and the consultant prior to installation. To this a careful work schedule shall be generated by the contractor and validated by the consultant after consulting with the owner

1.1.9. INFORMATION SUBMITALS

A. Proposed Protection Measures Prior to demolition: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

Pre-demolition photographs or video.

Statement of Refrigerant Recovery: Signed by refrigerant recovery technician.

B. Material certificates for installations.

C. Material test reports for installations.
D. Installation certificate of specialists for demolision and installation.
E. Strategy Report for Health, safety and environment

1.1.10 ACTION SUBMITALS

A. Product Data: For each type of product.
B. Samples: For each type of exposed finish required showing color and type.
C. Method statement for each installation

1.1.11 CLOSEOUT SUBMITALS

A. As built plans.
B. Maintenance data

1.1.12 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.1.13 FIELD CONDITION

A. Isolate working environment from normal hospital environment.
B. Field conditions in compliance with product manufacture's requirements and with technical SPECS and with Codes Applicable in Cameroon.
C. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during demolition and installations.

1.1.14 ENVIRONMENT AND SAFETY

A. Isolate environment not to cause any health hazards to workers and users of building.
B. Equip workers with all what is needed for their safety.
C. A HSE technician must be present.
D. Dispose all harmful products issuing out of demolition immediately.
E. Weekly incident report.
F. Ensure work environment is kept clean after every working day.

1.2. MECHANICAL WORKS FOR INTERNAL TOILETS

1.2.1 SUMARY

Section includes:

- Dismantling of existing wash basin, wc and all other sanitary equipment
- Remove all supply pipes through screed
- Remove every existing drainage pipes in zones as shown on plans PL DETAIL 4 and PL DETAIL 6.

- Replace damaged drainage pipes in other location
- Repair any tempered supply pipe through wall.
- Redo all internal supply piping works for water supply through screed to include all necessary manifold boxes, piping to external supply, and piping from manifold to equipment using PER pipes or equivalent.
- Redo drainage piping to specific areas to respect design attached (PL DETAIL 4 and PL Detail 6)
- Replace worn out equipment: wcs, wash basin, showers, tissue paper holders, towel holders, grab bars, soap dispensers, mirrors.
- Reinstallation of sanitary equipment in good condition: wcs, wash basin, showers, tissue paper holders, towel holders, grab bars, soap dispensers, mirrors.
- Repairs of leakage, damaged taps etc.

1.2.2 DISMANTLING EQUIPMENT

A. Unless otherwise indicated, all equipment issuing out from dismantling primarily belong to the owner. However, contractor and consultant will verify which of the equipment are still in good condition to be reused in the project.

1.2.3 REMOVE EXISTING SUPPLY PIPES THROUGH SCREED

A. High risk is possible that in breaking existing floor tiling, piping through screed would be tempered with. Contractor therefor shall:
   Remove every supply piping passing through screed to avoid any leaks
   Repair every supply piping that passes through the wall to avoid any leaks.
B. Damaged piping removed belongs to the contractor and shall be evacuated to a chosen location taken into account the waste disposal laws applicable in the republic of Cameroon.

1.2.4 REMOVE DRAINAGE PIPING COMPLETELY IN SPECIFIC AREAS

A. Areas involved: See PL Detail 4 and PL Detail 6 on layout
B. Remove every drainage piping in these specific zones completely
   Repair any damaged drainage piping in other locations
C. Unless otherwise indicated, all drainage piping removed primarily belong to the owner.

1.2.5 DOMESTIC WATER SUPPLY PIPING WITHIN TOILET AREA

A. Area include all internal toilet distribution pipes from internal toilet manifold.
B. Potable-water piping and components shall comply with NSF 14 and NSF 61. Plastic piping components shall be marked with "NSF-pw."
C. Piping shall be done with PER pipes or any equivalent flexible piping from the water manifold to the equipment.
D. Each equipment must have a separate piping connection controlled by a stop valve in the water manifold.

- Replace damaged drainage pipes in other location
- Repair any tempered supply pipe through wall.
- Redo all internal supply piping works for water supply through screed to include all necessary manifold boxes, piping to external supply, and piping from manifold to equipment using PER pipes or equivalent.
- Redo drainage piping to specific areas to respect design attached (PL DETAIL 4 and PL Detail 6)
- Replace worn out equipment: wcs, wash basin, showers, tissue paper holders, towel holders, grab bars, soap dispensers, mirrors.
- Reinstallation of sanitary equipment in good condition: wcs, wash basin, showers, tissue paper holders, towel holders, grab bars, soap dispensers, mirrors.
- Repairs of leakage, damaged taps etc.

1.2.2 DISMANTLING EQUIPMENT

A. Unless otherwise indicated, all equipment issuing out from dismantling primarily belong to the owner. However, contractor and consultant will verify which of the equipment are still in good condition to be reused in the project.

1.2.3 REMOVE EXISTING SUPPLY PIPES THROUGH SCREED

A. High risk is possible that in breaking existing floor tiling, piping through screed would be tempered with. Contractor therefor shall:
   Remove every supply piping passing through screed to avoid any leaks
   Repair every supply piping that passes through the wall to avoid any leaks.
B. Damaged piping removed belongs to the contractor and shall be evacuated to a chosen location taken into account the waste disposal laws applicable in the republic of Cameroon.

1.2.4 REMOVE DRAINAGE PIPING COMPLETELY IN SPECIFIC AREAS

A. Areas involved: See PL Detail 4 and PL Detail 6 on layout
B. Remove every drainage piping in these specific zones completely
   Repair any damaged drainage piping in other locations
C. Unless otherwise indicated, all drainage piping removed primarily belong to the owner.

1.2.5 DOMESTIC WATER SUPPLY PIPING WITHIN TOILET AREA

A. Area include all internal toilet distribution pipes from internal toilet manifold.
B. Potable-water piping and components shall comply with NSF 14 and NSF 61. Plastic piping components shall be marked with "NSF-pw."
C. Piping shall be done with PER pipes or any equivalent flexible piping from the water manifold to the equipment.
D. Each equipment must have a separate piping connection controlled by a stop valve in the water manifold.

E. Pipe works shall be done in accordance to plans attached.
F. All necessary connections from the manifold to the compound water supply must be verified and repaired or replaced depending on its condition.
G. Solvent Cements for Joining Pipes and Tubing: ASTM F 493.

   i. Solvent cement shall have a VOC content of 490 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   ii. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   iii. Solvent cement and adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

H. Pipe work through screed shall be fed through a flexible duct work for isolation so that it can be pulled out in case of any maintenance work.
I. Plastic, Pipe-Flange Gaskets, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.
J. Transition fittings shall be:

   i. Same size as pipes to be joined.
   ii. Pressure rating at least equal to pipes to be joined.
   iii. End connections compatible with pipes to be joined.

K. Plastic-to-Metal Transition Fittings:

   a. CPVC or PVC or PER one-piece fitting with manufacturer's Schedule 80 equivalent dimensions.
   b. One end with threaded brass insert and one solvent-cement-socket or threaded end.

L. Plastic-to-Metal Transition Unions:
   Description

   a. CPVC or PVC or PER four-part union.
   b. Brass or stainless-steel threaded end.
   c. Solvent-cement-joint or threaded plastic end.
   d. Rubber O-ring.
   e. Union nut.

M. Hangers and supports for pipes.

Installation must be done to give enough encourage on wall and floor to avoid movement due to water under pressure running through the pipe.

N. Connection:
Connection must be done with short off valves at the level of the manifold and any piping connection to the manifold.

O. Field quality control
Perform the following tests and inspections:

1. Piping Inspections :

a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.

c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Piping Tests :

a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
d. Cap and subject piping to static water pressure of 345 kPa above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
f. Prepare reports for tests and for corrective action required.

Domestic water piping will be considered defective if it does not pass tests and inspections.

Prepare test and inspection reports.

P. Adjusting

Perform the following adjustments before operation:

1. Open shutoff valves to fully open position.
2. Open throttling valves to proper setting.
3. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
4. Remove and clean strainer screens. Close drain valves and replace drain plugs.
5. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
6. Check plumbing specialties and verify proper settings, adjustments, and operation.

Q. Cleaning

Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

    a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    b. Fill and isolate system according to either of the following:

        1) Fill system or part thereof with water/chlorine solution with at least 50 ppm (50 mg/L) of chlorine. Isolate with valves and allow to stand for 24 hours.
        2) Fill system or part thereof with water/chlorine solution with at least 200 ppm (200 mg/L) of chlorine. Isolate and allow to stand for three hours.

c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
d. Repeat procedures if biological examination shows contamination.
e. Submit water samples in sterile bottles to authorities having jurisdiction.

Prepare and submit reports of purging and disinfecting activities. Include copies of watersample approvals from authorities having jurisdiction.

Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

R. Piping schedule

Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

Under-building-slab, domestic water, building-service piping, NPS 3 (DN 80) and smaller , shall be of the following:

1. PVC, Schedule 40; socket fittings; and solvent-cemented joints.

Aboveground domestic water piping, NPS 2 (DN 50) and smaller, shall be of the following:

1. CPVC, Schedule 40; socket fittings; and solvent-cemented joints.
2. CPVC Tubing System: CPVC tube; CPVC socket fittings; and solvent-cemented joints. NPS 1-1/2 (DN 40) and NPS 2 (DN 50) CPVC pipe with CPVC socket fittings may be used instead of tubing.
3. PVC, Schedule 40; socket fittings; and solvent-cemented joints.

Aboveground domestic water piping, NPS 2-1/2 to NPS 4 (DN 65 to DN 100), shall be of the following: CPVC, Schedule 40; socket fittings; and solvent-cemented joints.

1.2.6 INTERNAL DRAINAGE PIPING WITHIN TOILET AREA

A. Area include complete refurbishment of areas of plan marked PL DETAIL 4 and PL DETAIL 6. Verification and changing of damaged pipes in other areas required.
B. Work shall involve pipes, tubes and fittings
C. Seismic Performance: Soil, waste, and vent piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
D. Piping Material shall be PVC pipe and fittings which includes:
   - Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.
   - Cellular-Core PVC Pipe: ASTM F 891, Schedule 40.

- PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.
- Adhesive Primer: ASTM F 656.

1. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers." E.

- Solvent Cement: ASTM D 2564.
  1. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  2. Solvent cement shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Specialty pipe fittings
Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.
2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
3. Unshielded, Non pressure Transition Couplings:

   a. Standard : ASTM C 1173.
   b. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
   c. Sleeve Materials:
      1) For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.

   For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

F. Installation shall be done in accordance to drawings attached.
G. Joint construction

Plastic, Non pressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 Appendixes.

H. Specialty pipe fitting installation
Transition Couplings:
1. Install transition couplings at joints of piping with small differences in OD's.
2. In Drainage Piping: Shielded, non-pressure transition couplings.

I. Hangers and supports for pipes.
Installation must be done to give enough encourage on wall and floor to avoid movement due to water under pressure running through the pipe.

J. Connections
Drawings indicate general arrangement of piping, fittings, and specialties.
Connect waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.

Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

K. Field quality control
During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

Re-inspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for re-inspection.
Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 30 kPa. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 250 Pa. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

Prepare reports for tests and required corrective action.

1.2.7 ACTION SUBMITTALS

A. Product Data: For transition fittings and dielectric fittings.
B. Sample pipes

1.2.8 CLOSEOUT SUBMITTALS

A. Field quality-control reports.

1. Pipe: ASTM D 3034, SDR 35, PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints.
2. Fittings: ASTM D 3034, PVC with bell ends.
3. Gaskets: ASTM F 477, elastomeric seals.

2.2.5 *NONPRESSURE-TYPE TRANSITION COUPLINGS*

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground non pressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:
   1. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
   2. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

C. Unshielded, Flexible Couplings:

   1. Description: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistantmetal tension band and tightening mechanism on each end.

D. Ring-Type, Flexible Couplings: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

2.2.6 *CLEANOUTS*

A. Separate PVC elbows inside manhole for grey and black water that connects pipe inlet into manhole and pipe outlet and well corked to permit opening and cleaning in case of blockage.
B. Clean out shall be placed at a distances of at most 15 m and at every point where pipe work connects to building.
C. Contractor has another option instead of elbow clean outs in manhole to do separate manhole for grey and black water.

2.2.7 *MANHOLES OR INSPECTION CHAMBERS*

A.Standard Precast Concrete Manholes or inspection chambers:

1. Description: ASTM C 478M, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Internal dimensions of: 500x500 mm minimum in a case of combine manhole or 400x400 mm in a case of separate manhole for grey and black water unless otherwise indicated.
3. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.

4. Base Section: 150-mm minimum thickness for floor slab and 100-mm minimum thickness for walls and base riser section; with separate base slab or base section with integral floor.

5. Riser Sections: 100-mm minimum thickness, of length to provide depth indicated.

6. Joint Sealant: ASTM C 990M, bitumen or butyl rubber.
7. Resilient Pipe Connectors: ASTM C 923M, cast or fitted into manhole walls, for each pipe connection.
8. Adjusting Rings: Interlocking HDPE rings, with level or sloped edge in thickness and diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
9. Grade Rings: Reinforced-concrete rings, 150- to 225-mm total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.

B. Manhole Frames and Covers:

Done with reinforced concrete of thickness 8 cm

2.2.8 *CONCRETE*

A. General: Cast-in-place concrete complying with ACI 318, ACI 350M/350RM, and the following:

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

EXECUTION

2.2.9 *EARTHWORK*

A. Excavating, trenching, and backfilling

2.2.10 *PIPING INSTALLATION*

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewer piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipejacking process of microtunneling.

F. Install gravity-flow, non pressure, drainage piping according to the following:

1. Install piping pitched down in direction of flow, at minimum slope of 1 percent unless otherwise indicated.
2. Install piping DN 150 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
3. Install piping with 700-mm minimum cover
4. Install PVC corrugated sewer piping according to ASTM D 2321 and ASTM F 1668.
5. Install PVC Type PSM sewer piping according to ASTM D 2321 and ASTM F 1668.

G. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

2.3 STORM WATER DRAINAGE

2.3.1 Storm water drainage include cleaning of existing gutters, creating down chambers to isolate water from the central hospital towards gutter, diverting gutter and piping

2.3.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

2.3.3 CLOSEOUT SUBMITTALS

B. Test report of corrected slope of gutter
C. As Built Plans

2.3.4 QUALITY ASSURANCE

A. Debris from the cleaning of gutters shall immediately be evacuated from the hospital environment.

B. Work shall be done in compliance to execution drawings

2.3.5 *CONCRETE*

A. General: Cast-in-place concrete complying with ACI 318, ACI 350M/350RM, and the following:

5. Cement: ASTM C 150, Type II.
6. Fine Aggregate: ASTM C 33, sand.
7. Coarse Aggregate: ASTM C 33, crushed gravel.
8. Water : Potable.

2.3.6 EXECUTION

A. Gutter shall be clean and dirt cleared off site
B. Earth work shall be done in the zone where gutter is diverted.
C. Concrete poured along entire base of existing gutter to adjust the slope to at least 2%
D. Gutter cover shall be redone with sizes of 40 cm length by 8 cm thick to cover entire gutter from being exposed. Gutter cover shall be jointly fitted with no whole in between.
E. Areas where there are down drains from the Central Hospital shall be covered with a reinforced concrete down chamber as seen in designs
F. Diversion of gutter shall be casted along the entire zone of the earth works with similar covers above.

DIVISION 3: NEW WAITING AREA

3.1 SUMARY

Section includes:

- Demolish existing waiting area and disposal of material to a location indicated by the CURY authorities.
- Excavation of foundation pits and foundation trenches.
- Blinding concrete.
- Reinforce concrete footing and foundation pillars for the structure.
- Construction of a stone embankment wall as indicated on plan.
- Construction of foundation wall with CMU 20 mixed filled with grout.
- Reinforced concrete ground beams.
- All necessary anchorage of metallic structure on the concrete.
- Backfilling and compacting with successful layers of fill of 30 cm each.
- Underground sanding and concreting of ground slab.
- Supply and place metallic column tubes of size as indicated on plan.
- Elevation of wall with CMU 15 at the west end with windows as indicated on the plan.
- All necessary plastering, dressing.
- Construction of truss elements with details as indicated in the design.
- All necessary welding and anchorage of truss elements to existing structure.
- Supply and welding of roof sheet supports on the truss elements as indicated.
- Placing of the roof sheets; all necessary anchorage factored in.
- Supply and fitting of roof gutter with all necessary anchorage included.
- Rain water down pipes connected to compound drain.
- Reinforcement and concreting of coping for space between roof and wall.
- All necessary painting, antirust etc. on walls and metallic structure.
- Supply and install concrete screen wall in window openings on the elevated wall.
- Placing of floor tiles and skirting.

3.2 DEMOLISION

A. See section 1.1.2

3.3 EARTH WORKS

A. All necessary excavation works done to respect the dimensions of structures indicated on plans.

3.4 CONCRETE

A. Includes all type of concrete: lean concrete, reinforced concrete etc.

B. Use prescriptions below to cast lean concrete, reinforced concrete footing, short columns and ground beams, ground slab.
C. Place Metallic anchorage for the metallic structure of the waiting area in accordance to designs.

PART 1 - GENERAL

3.4.1 Related documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Specification Sections and Design of concrete structures. European Standards EN 1992-1-1, apply to this Section.

3.4.2 Summary

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Divisions : Division 2, Division 3, Division 4.

3.4.3 Definitions

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

3.4.4 Action submittals

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement.

D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.

3.4.5 Informational submittals

A. Welding certificates.

B. Material certificates.

C. Material test reports.

D. Floor surface flatness and levelness measurements.

3.4.6 Quality assurance

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."

D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

E. Pre-installation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

3.4.7 Form-facing materials

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

3.4.8 Steel reinforcement

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 420, deformed.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice.

3.4.9 Concrete materials

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project: Portland Cement: ASTM C 150, Type I, gray.
B. Normal-Weight Aggregates: ASTM C 33, graded.

1. Maximum Coarse-Aggregate Size: 25 mm nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Lightweight Aggregate: ASTM C 330, 25-mm nominal maximum aggregate size.

D. Water: ASTM C 94/C 94M and potable.

3.4.10 Admixtures

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

3.4.11 Vapor retarders

A. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 0.25 mm thick.

3.4.12 Curing materials

A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

B. Water: Potable.

3.4.13 Related materials

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

3.4.14 Concrete mixtures

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.

C. Admixtures: Use admixtures according to manufacturer's written instructions. 1. Use water-reducing or plasticizing admixture in concrete, as required, for placement and workability.

D. Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 25.0 MPa at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Slump Limit: 100 mm, plus or minus 25 mm.
4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 25-mm nominal maximum aggregate size.
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

3.4.15 Fabricating reinforcement

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice." or acceptable norms by authorities having jurisdiction.

3.4.16 Concrete mixing

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 30 and 32 deg C, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 32 deg C, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.4.17 Formwork

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Do not chamfer exterior corners and edges of permanently exposed concrete.

3.4.18 Embedded items

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.4.19 Vapor retarders

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 150 mm and seal with manufacturer's recommended tape.

3.4.20 Steel reinforcement

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.4.21 Joints

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least onefourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 3.2 mm. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 3.2-mm-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

E. Waterstops: Install in construction joints and at other joints indicated according to manufacturer's written instructions.

3.4.22 Concrete placement

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

C. Cold Weather Placement: Comply with ACI 306.1.

D. Hot-Weather Placement: Comply with ACI 301.

3.4.23 Finishing formed surfaces

A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching

adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.4.24 Finishing floors and slabs

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bullfloated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 6 mm in one direction.

1. Apply scratch finish to surfaces to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

3.4.25 Concrete protecting and curing

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 1 kg/sq. m x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 300 mm, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3.4.26 Concrete surface repairs

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.4.27 Field quality control

A. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

3.5 METALLIC CONSTRUCTION

A. Include metallic columns, metallic roof trusses and all necessary welding works.

PART 1 - GENERAL

3.5.1 Preinstallation meetings

A. Preinstallation Conference: Conduct conference at Project site.

3.5.2 Action submittals

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel structure and trusses; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

C. Delegated-Design Submittal: For cold-formed steel trusses.

3.5.3 Informational submittals

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product test reports.

D. Field quality-control reports.

3.5.4 Quality assurance

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Product Tests: Mill certificates or data from a qualified testing agency, or in-house testing with calibrated test equipment, indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1. 3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

3.5.5 Performance requirements

A. Delegated Design: Engage a qualified professional engineer, to design cold-formed steel framing.

B. Structural Performance: Provide cold-formed steel trusses capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: As indicated.
2. Deflection Limits: Design metal structures and trusses to withstand design loads without deflections greater than the following:

   a. Floor Trusses: Vertical deflection of 1/480 for live loads and l/360 for total loads of the span.
   b. Roof Trusses: Vertical deflection of 1/240 of the span.

3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 67 deg C.

C. Cold-Formed Steel Framing Design Standards:
   1. Roof Trusses: Design according to Design of steel structures, European Standards, EN 1993-1-1.

D. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

3.5.6 Cold-formed steel structure and truss materials

A. Steel Sheet: ASTM A 1003/A 1003M, structural grade, Type H, metallic coated, of grade and coating weight as follows:

1. Grade : EN10025-2-S235.
2. Coating: Z180, ZF180, AZ150, or ZGF90.

3.5.7 Roof trusses

A. Roof Truss Members: Manufacturer's standard steel sections.

3.5.8 Accessories

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, structural grade, Type H, metallic coated, of same grade and coating weight used for truss members and metal structures.

B. Provide accessories of manufacturer's standard thickness and configuration unless otherwise indicated.

3.5.9 Anchors, clips, and fasteners

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and Appendix D in ACI 318, greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

D. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

1. Head Type: Low-profile head beneath sheathing; manufacturer's standard

elsewhere. E. Welding Electrodes: Comply with AWS standards.

3.5.10 Miscellaneous materials

A. Shims: Load bearing, of high-density multimonomer plastic, nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

3.5.11 Fabrication

A. Fabricate cold-formed steel trusses and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate trusses using jigs or templates.
2. Cut truss members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel truss members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator.

   a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

4. Fasten other materials to cold-formed steel trusses by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace trusses to withstand handling, delivery, and erection stresses. Lift fabricated trusses to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1:960 and as follows:

1. Spacing: Space individual framing members no more than plus or minus 3 mm from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-ofsquare tolerance of 3 mm.

PART 3 - EXECUTION

3.5.12 Preparation

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

3.5.13 Installation

A. Install, bridge, and brace cold-formed steel trusses according to AISI S200, AISI S214, AISI's "Code of Standard Practice for Cold-Formed Steel Structural Framing," and manufacturer's written instructions unless more stringent requirements are indicated.

B. Install cold-formed steel trusses and accessories plumb, square, and true to line, and with connections securely fastened.

1. Fasten cold-formed steel trusses by welding or mechanical fasteners.

   a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate mechanical fasteners and install according to Shop Drawings; comply with requirements for spacing, edge distances, and screw penetration.

C. Install temporary bracing and supports. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

D. Truss Spacing: As indicated.

E. Do not alter, cut, or remove framing members or connections of trusses.

F. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacings indicated.

G. Erect trusses without damaging framing members or connections.

H. Coordinate with wall framing to align webs of bottom chords and load-bearing studs or continuously reinforce track to transfer loads to structure. Anchor trusses securely at all bearing points.

I. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1:960 and as follows:

1. Space individual trusses no more than plus or minus 3 mm from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.5.14 Field quality control

A. Special Inspections: Engage a qualified special inspector to perform inspections.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Field and shop welds will be subject to testing and inspecting.

D. Prepare test and inspection reports.

3.5.15 Repairs and protection

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal trusses are without damage or deterioration at time of Substantial Completion.

3.6 CONCRETE MASONRY UNITS (CMU 15 and 20)

A. Include:
CMU 20 filled with grout for foundation wall.
CMU 15 for elevation walls

PART 1 - GENERAL

3.6.1 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. CMU filled with grout: Concrete masony unit filled with grout

C. CMU 20: 20 cm thick CMU wall

D. CMU 15: 15 cm thick CMU wall

3.6.2 INFORMATIONAL SUBMITTALS

A. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
   1. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

PART 2 - PRODUCTS

3.6.3 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

3.6.4 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

B. CMUs: ASTM C90.

   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 14.8 MPa.

   2. Density Classification: Normal weight.

3.6.5 CONCRETE LINTELS

A. Concrete Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated.

3.6.6 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for coldweather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C91/C91M.

E. Aggregate for Mortar: ASTM C144.

1. White-Mortar Aggregates: Natural white sand or crushed white stone.
2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

F. Aggregate for Grout: ASTM C404.

G. Water : Potable.

3.6.7 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 420.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 3.77-mm steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated. C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.

1. Interior Walls: galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized carbon steel.
3. Wire Size for Side Rods: 3.77-mm diameter.
4. Wire Size for Cross Rods: 3.77-mm diameter.

5. Spacing of Cross Rods: Not more than 407 mm o.c.
6. Provide in lengths of not less than 3 m.

3.6.8 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A153/A153M, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
3. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

B. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 1.52-mm-thick steel sheet, galvanized after fabrication.
2. Tie Section: Triangular-shaped wire tie made from 4.76-mm- diameter, hot-dip galvanized-steel wire.

C. Partition Top Anchors: 2.66-mm-thick metal plate with a 9.5-mm-diameter metal rod 152 mm long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

D. Rigid Anchors: Fabricate from steel bars 38 mm wide by 6.35 mm thick by 610 mm long, with ends turned up 51 mm or with cross pins unless otherwise indicated.

1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A153/A153M.

3.6.9 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

1. Fabricate continuous flashings in sections 2400 mm long minimum, but not exceeding 3.7 m. Provide splice plates at joints of formed, smooth metal flashing.
2. Fabricate metal drip edges from stainless steel. Extend at least 76 mm into wall and 13 mm out from wall, with outer edge bent down 30 degrees **and hemmed**.

3. Fabricate metal sealant stops from stainless steel. Extend at least 76 mm into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 19 mm and down into joint 6 mm to form a stop for retaining sealant backer rod.
4. Fabricate metal expansion-joint strips from **stainless steel or copper** to shapes indicated.

B. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

3.6.10 MASONRY-CELL FILL FOR CMU FILLED WITH GROUT

A. Lightweight-Aggregate Fill: ASTM C331/C331M.

3.6.11 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use portland cement-lime or masonry cement mortar unless otherwise indicated.
3. For exterior masonry, use portland cement-lime or masonry cement mortar.
4. For reinforced masonry, use portland cement-lime or masonry cement mortar.

B. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For masonry below grade or in contact with earth, use Type M.
2. For reinforced masonry, use Type S.
3. For mortar parge coats, use Type S or Type N.
4. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
5. For interior nonload-bearing partitions, Type O may be used instead of Type N. C.

Grout for Unit Masonry: Comply with ASTM C476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.

2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 14 MPa.
3. Provide grout with a slump of 200 to 280 mm as measured according to ASTM C143/C143M.

PART 3 - EXECUTION

3.6.12 INSTALLATION, GENERAL

A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.6.13 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 12 mm or minus 6 mm.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 12 mm.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 6 mm in a story height or 12 mm total. B. Lines and Levels :

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 6 mm in 3 m, or 12-mm maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 3 mm in 3 m, 6 mm in 6 m, or 12-mm maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 6 mm in 3 m, 9 mm in 6 m, or 12-mm maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 3 mm in 3 m, 6 mm in 6 m, or 12-mm maximum.
5. For lines and surfaces, do not vary from straight by more than 6 mm in 3 m, 9 mm in 6 m, or 12-mm maximum. C.

Joints :

1. For bed joints, do not vary from thickness indicated by more than plus or minus 3 mm, with a maximum thickness limited to 12 mm.

2. For head and collar joints, do not vary from thickness indicated by more than plus 9 mm or minus 6 mm.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 3 mm.

3.6.14 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets.

Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 100-mm horizontal face dimensions at corners or jambs.

C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

D. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

E. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

F. Fill cores in hollow CMUs with grout 600 mm under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.6.15 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.6.16 MASONRY-CELL FILL

A. Pour lightweight-aggregate fill into cavities to fill void spaces. Maintain inspection ports to show presence of fill at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of fill to one story high, but not more than 6 m.

B. Install molded-polystyrene insulation units into masonry unit cells before laying units.

3.6.17 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 16 mm on exterior side of walls, 13 mm elsewhere. Lap reinforcement a minimum of 150 mm.

1. Space reinforcement not more than 406 mm o.c.
2. Space reinforcement not more than 203 mm o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 203 mm above and below wall openings and extending 305 mm beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.6.18 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:

1. Provide an open space not less than 25 mm wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 610 mm o.c. vertically and 915 mm o.c. horizontally.

3.6.19 FLASHING

A. General: Install embedded flashing at ledges and other obstructions to downward flow of water in wall where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At lintels, extend flashing a minimum of 150 mm into masonry at each end. At heads and sills, extend flashing 150 mm at ends and turn up not less than 50 mm to form end dams.
3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 13 mm back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
4. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 13 mm back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.

C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

3.6.20 REINFORCED UNIT MASONRY

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout.

Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 1520 mm.

3.6.21 FIELD QUALITY CONTROL

A. Testing and Inspecting: Engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Testing Prior to Construction: One set of tests.

C. Testing Frequency: One set of tests for each 464 sq. m of wall area or portion thereof.

D. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C140 for compressive strength.

E. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.

F. Mortar Test (Property Specification): For each mix provided, according to ASTM C780. Test mortar for compressive strength.

G. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

H. Prism Test: For each type of construction provided, according to ASTM C1314 at28 days.

3.6.22 PARGING

A. Parge exterior faces of below-grade masonry walls, where indicated, in two uniform coats to a total thickness of 19 mm. Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.

B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 3 mm per 300 mm. Form a wash at top of parging and a cove at bottom. C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.6.23 REPAIRING, POINTING, AND CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
2. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.6.24 MASONRY WASTE DISPOSAL

A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Do not dispose of masonry waste as fill within 450 mm of finished grade.

B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

DIVISION 4: *EXTERNAL TOILET*

4.1 SUMMARY

Work under this division includes:

Foundation

- Excavation of trenches
- Blinding concrete
- Reinforce concrete for footing, columns and beams
- Elevation of walls with CMU 20 filled with grout.
- Backfilling
- Sand fill and concreting of ground slab

Elevation

- Reinforced concrete for columns, and beams
- Elevation of block wall with CMU 15 as shown on design
- Plastering of walls
- Roofing (all necessary truss elements, poulines in wood, roof sheets and accessories, roof gutter, down pipes etc.

Finishing

- Screed on the floor
- Water proofing on floor and wall to a height of 1.80 m in shower cabinets and 1.20 m in other locations.
- Supply and placing of 30x30 floor tiles
- Supply and placing of 25x40 wall tiles on toilet walls
- Internal painting on all non-tile surface
- External painting

Mechanical

- Water supply to toilet manifold using PPR pipe
- Water supply from manifold to equipment using PER pipes
- Water drainage to include all necessary assemblies to biofil digester
- Construction of a biofil digester

Plumbing equipment

- Wc, wash basin, floor drains, soap dispensers, shower, mirror light, tissue paper holders, towel holders, etc.

Electricity

- Supply and fitting of pipes and cables
- Supply of switches and bulbs to include every accessory
- Mirror lights etc.
- External Toilet
- External Toilet

4.2 FOUNDATION

A. Reinforce concrete for foundation footings, columns, beams, grade slab and lintel done according to Section 3.4 above
B. CMU 20 filled with grout done for the foundation according to the prescriptions of Section 3.6 above.

4.3 ELEVATION

A. Reinforce concrete for columns, beams, lintel done according to Section 3.4 above
B. CMU 15 done according to the prescriptions of Section 3.6 above leaving openings for doors and windows as per drawings.

4.4 ROOFING

A. Roof sheets shall be in accordance to the requirements of Division 5 of this SPECS

4.5 FINISHING

A. Done according to Section 1.1.3, 1.1.4, 1.1.5

4.6 MECHNAICAL

A. Section 1.2.5, 1.2.6
B. BIOFIL DIGESTER
   - Construct a Biofil Digester with a capacity of 10 persons as shown on the designs to treat sewage water from the external toilet
   - Biofil Digester shall consist of a perforated concrete slab that drains immediately the water from flushing into a drain or compound drain as shown on the plans. Perforated slab shall be done with concrete of Minimum Compressive Strength: 25.0 MPa at 28 days. Maximum Water-Cementitious Materials Ratio: 0.20. Mixture water content shall be considered ok if when place in the hand leaves a low paste stain to the hand when removed. Consult an expert in perforated concrete to get the right mix.
   - Organic fiber with bacteria content shall be placed on top of the perforated slab to treat the fecal component of the sewage anaerobically. The following chemicals shall be added

1. Biozone Bioclean to eat up all soap, grease, detergents and other organic solids waste. It shall be applied from the wash basins seasonally
2. Biozone Bamoyeast is used to break down the fecal matter in the biodigester
3. Biozone Environzyme to treat the water leaving the biodigester into the environment and any other necessary components.

- Biodigester shall be airtight to prevent any aerobic digestion. For this the exhaust pipe from the Biodigester shall be passed through the grey water grease remover that shall also serve to trap any oxygen from going in.

4.7 INFORMATION SUBMITALS

A. Material certificates for installations.
B. Material test reports for installations.
C. Strategy Report for Health, safety and environment

4.8 ACTION SUBMITALS

D. Product Data: For each type of product.
E. Samples: For each type of exposed finish required showing color and type.
F. Method statement for each installation

4.9 CLOSEOUT SUBMITALS

C. As built plans.
D. Maintenance data

4.10 QUALITY ASSURANCE

Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

DIVISION 5: GENERATOR HOUSE ROOF

5.1 SUMARY

- Removal of existing roof sheet to dispose to a location designated by the hospital authorities
- Removal of damaged roof truss to dispose to a location designated by the hospital authorities
- Placing of new roof truss to replace damaged roof truss
- Placing of new roof sheet to include every necessary fixing accessories
- Roof gutter and every necessary accessories

5.2. DEMOLISION OF EXISTING ROOF

A. Unless otherwise indicated, all roof sheets removed and wood issuing out from demolition primarily belong to the owner. However, contractor and consultant will verify which of the material can be re-employ back into the project.
B. All debris issuing out from demolition belongs to the contractor and shall be evacuated to a chosen location taken into account the waste disposal laws applicable in the republic of Cameroon.
C. Carefully salvage in a manner to prevent damage and promptly return to Owner or re-employ in the project as per the consultant's prescriptions.

5.3 EXECUTION PROCEDURE

A. Fabricate wooden roof trusses with rafters to replace existing wants that are damaged
B. Wood shall be treated with a product validated by the consultant
C. The same profile of the existing truss shall be respected
D. Proceed to a replacement of all roof sheets with a roof sheet according to the SPECS below.

METALIC ROOF SHEET

5.4 ACTION SUBMITTALS

A. Product Data: For each of the following:

1. Roofing sheet metal.
2. Fasteners.
3. Sealant tape.
4. Elastomeric sealant.

B. Samples: For each exposed product and for each color and texture specified, 300 mm long by actual width.

PRODUCTS

5.5 PERFORMANCE REQUIREMENTS

A. General Performance: Sheet metal roofing system, including, but not limited to, metal roof panels, cleats, anchors and fasteners, sheet metal flashing integral with sheet metal roofing, fascia panels, trim, underlayment, and accessories, shall comply with requirements without failure due to defective manufacture, fabrication, or installation, or due to other defects in construction. Sheet metal roofing shall remain watertight.

B. Sheet Metal Roofing Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or indicated on Drawings.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.

1. Temperature Change: 67 deg C, ambient; 100 deg C, material surfaces.

5.6 ROOFING SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A653/A653M, Z275 coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A792/A792M, Class AZM150 coating designation, Grade 275; with smooth, flat surface; prepainted by coil-coating process to comply with ASTM A755/A755M.

1. Thickness: Nominal 0.56 mm unless otherwise indicated.
2. Exposed Coil-Coated Finish:

   a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

3. Color: As selected by Architect from manufacturer's full range **<Insert color>**.

4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.013 mm.

5.7 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete roofing system and as recommended by primary sheet metal manufacturer unless otherwise indicated.

B. Fasteners: Self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.

1. General:

a. Exposed Fasteners: Heads matching color of sheet metal roofing, using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of roofing.
b. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed; with hex-washer head.

2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 13 mm wide and 3 mm thick.

D. Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal roofing and remain watertight.

5.8 ACCESSORIES

A. Sheet Metal Accessories: Provide components required for complete sheet metal roofing assembly, including trim, fasciae, corner units, clips, flashings, sealants, gaskets, fillers, metal closures, closure strips, and similar items. Match material and finish of sheet metal roofing unless otherwise indicated.

1. Cleats: Intermittent and continuous attachment devices for mechanically seaming into joints and formed from the following materials and thicknesses unless otherwise indicated:

a. Metallic-Coated Steel Roofing: 0.64- mm-thick stainless steel.

2. Backing Plates: Plates at roofing splices, fabricated from material recommended by SMACNA's "Architectural Sheet Metal Manual."
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin foam or closed-cell laminated polyethylene; minimum 25-mm-thick, flexible-closure strips; cut or premolded to match sheet metal roofing profile. Provide closure strips where necessary to ensure weathertight construction.
4. Flashing and Trim: Formed from same material and with same finish as sheet metal roofing, minimum 0.46 mmthick.

B. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

5.9 FABRICATION

A. Custom fabricate sheet metal roofing to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions (panel width and seam height), geometry, metal thickness, and other characteristics of installation. Fabricate sheet metal roofing and accessories in shop to greatest extent possible.

B. Form exposed sheet metal work to fit substrates with little oil canning; free of buckling and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

1. Lay out sheet metal roofing, so transverse seams, if required, are made in direction of flow, with higher panels overlapping lower panels.
2. Offset transverse seams from each other 300 mm minimum.
3. Fold and cleat eaves and transverse seams in shop.
4. Form and fabricate sheets, seams, strips, cleats, valleys, ridges, edge treatments, integral flashings, and other components of metal roofing to profiles, patterns, and drainage arrangements indicated on Drawings and as required for leakproof construction.

C. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to SMACNA's "Architectural Sheet Metal Manual."

D. Sheet Metal Accessories: Custom fabricate flashings and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item required. Obtain field measurements for accurate fit before shop fabrication.

1. Form exposed sheet metal accessories without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
2. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant.
4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices of sizes recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.

E. Do not use graphite pencils to mark metal surfaces.

EXECUTION

5.10 EXAMINATION

A. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking, that tops of fasteners are flush with surface, and that installation is within flatness tolerances required for finished roofing installation.

B. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

C. Examine roughing-in for components and systems penetrating sheet metal roofing to verify actual locations of penetrations relative to seam locations of sheet metal roofing before installation.

5.11 PREPARATION

A. Lay out panel arrangement, before installation of sheet metal roofing.

1. Space fasteners not more than 460 mm o.c.

5.12 INSTALLATION, GENERAL

A. Install sheet metal roofing to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to installation characteristics required unless otherwise indicated on Drawings.

1. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required for complete roofing system.
2. Install sheet metal roofing true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant.
3. Anchor sheet metal roofing and other components of the Work securely in place, with provisions for thermal and structural movement.
4. Do not field cut sheet metal roofing by torch.
5. Provide metal closures at peaks eaves and each side of ridge and hip caps.
6. Flash and seal sheet metal roofing with closure strips at eaves, rakes, and perimeter of all openings. Fasten with self-tapping screws.
7. Locate and space fastenings in uniform vertical and horizontal alignment. Predrill panels for fasteners.
8. Install ridge and hip caps as sheet metal roofing work proceeds.
9. Lap metal flashing over sheet metal roofing to direct moisture to run over and off roofing.
10. Do not use graphite pencils to mark metal surfaces.

B. Thermal Movement: Rigidly fasten metal roof panels to structure at only one location for each panel.

1. Allow remainder of panel to move freely for thermal expansion and contraction.
2. Point of Fixity: Fasten each panel along a single common line of fixing located at eave.
3. Avoid attaching accessories through roof panels in manner that inhibits thermal movement.

C. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

D. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

E. Fasciae:

1. Align bottom of sheet metal roofing and fasten with blind rivets, bolts, or self-tapping screws.
2. Flash and seal sheet metal roofing with closure strips where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

5.13 CUSTOM-FABRICATED SHEET METAL ROOFING INSTALLATION

A. Install sheet metal roofing system with lines and corners of exposed units true and accurate.

1. Form exposed faces flat and free of buckles, excessive waves, and avoidable tool marks, considering metal temper and reflectivity.
2. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
3. Fold back sheet metal to form hem on concealed side of exposed edges unless otherwise indicated.

B. Install cleats to hold sheet metal roofing panels in position.

1. Attach each cleat with at least two fasteners to prevent rotation.
2. Space cleats not more than 300 mm o.c.
3. Bend tabs over fastener head.
4. Provide expansion-type cleats for roof panels that exceed 9.1 m in length.

C. Seal joints as required for watertight construction. For roofing with 3:12 slopes or less, use cleats at transverse seams.

1. Use sealant-filled joints unless otherwise indicated.

a. Embed hooked flanges of joint members not less than 25 mm into sealant.
b. Form joints to completely conceal sealant.

c. When ambient temperature at time of installation is between 4 and 21 deg C, set joint members for 50 percent movement each way.
d. Adjust setting proportionately for installation at higher ambient temperatures.
e. Do not install sealant-type joints at temperatures below 4 deg C.

2. Prepare joints and apply sealants

D. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

5.14 ACCESSORY INSTALLATION

A. Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion.

1. Coordinate installation with flashings and other components.
2. Install components required for complete sheet metal roofing assembly, including trim, seam covers, flashings, sealants, gaskets, fillers, metal closures, closure strips, and similar items.
3. Install accessories integral to sheet metal roofing

B. Flashing and Trim: Comply with performance requirements and SMACNA's "Architectural Sheet Metal Manual."

1. Provide concealed fasteners where possible, and install units true to line, levels, and slopes.
2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
3. Install flashing and trim as required to seal against weather and to provide finished appearance, including, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.
4. Install continuous strip of self-adhering underlayment at edge of continuous flashing overlapping self-adhering underlayment, where "continuous seal strip" is indicated in SMACNA's "Architectural Sheet Metal Manual" and on Drawings.
5. Install exposed flashing and trim without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
6. Install sheet metal flashing and trim to fit substrates, and to result in waterproof and weather-resistant performance.
7. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.

    a. Space expansion joints at maximum of 3 m with no joints within 600 mm of corner or intersection.
    b. Form expansion joints of intermeshing hooked flanges, not less than 25 mm deep, and filled with butyl sealant concealed within joints.
    c. Use lapped expansion joints only where indicated on Drawings.

C. Pipe Flashing: Form flashing around pipe penetration and sheet metal roofing. Fasten and seal to sheet metal roofing as recommended in SMACNA's "Architectural Sheet Metal Manual."

5.15 CLEANING

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. On completion of sheet metal roofing installation, clean finished surfaces as recommended by sheet metal roofing manufacturer.

C. Clean and neutralize flux materials. Clean off excess solder.

D. Clean off excess sealants.

5.16 PROTECTION

A. Remove temporary protective coverings and strippable films as sheet metal roofing is installed unless otherwise indicated in manufacturer's written installation instructions.

B. Prohibit traffic of any kind on installed sheet metal roofing.

C. Maintain sheet metal roofing in clean condition during construction.

D. Replace sheet metal roofing components that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

DIVISION 6: *INCINERATOR ROOM AND INCINERATOR*

6.1 SUMARY

- Remove existing roof
- Prepare and concrete solid slab on the existing incinerator house of thickness 15 cm
- All necessary roof slopes
- Install new incinerator with an exhaust pipe that goes through the concrete roof and continue to a height 4 m above generator house using a metal pipe of diameter adequate to suit the diameter of the waste exhaust pipe.
- Install at the end of pipe a necessary device to prevent rain water from seeping in.
- Hacking of existing walls, sanding and repainting
- Water proofing on top of the roof slab
- Redo floor tiles.
- Install new incinerator of 50kg/H

6.2 ACTION SUBMITTALS

A. Product Data: Include product type, characteristics, size, importation time frame etc.

B. Shop Drawings: From the manufacturing firm showing how product shall be mounted.

C. Include all precautions to be put in place during installation and when in use

6.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For production company.

B. Field quality-control test reports.

6.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Employ a qualified engineer to mount given product.
B. Comply to BS E7N4 6-2: 1997

PRODUCTS

- Medical Waste Incinerator of up to 50kg/h
- Secondary chamber for reburn of harmful emissions

- Maximum temperature 850 °C
- Able to retain gases for at least 2 s
- Model I8-M70

DIVISION 7: WATER TANK AND BOOSTER PUMPS

7.1 SUMARY

- Excavation and demolition at the west end of tank where currently there is a drain pipe
- Concreting of a new rafter footing for pump house
- Elevation of CMU 15 walls with door access opening for pump house and concreting of a slab wall on top of the pump house
- Concrete a well reinforced slab on existing water tank slab as shown on plans to carry water tank.
- Installation of **three 5000l** water tank on top of this slab to serve as domestic water supply tanks
- All necessary piping connections to new tanks
- Check and refurbish existing fire water tank to use for this purpose
- Install fire booster pumps in newly constructed Pump house and connect to the fire hydrant system of **Capacity: 6 Bar**
- Install domestic water supply booster pumps in newly constructed Pump house and connect to the domestic water supply system of **Capacity: 3 Bar.**
- Repair existing vacuum pumps to keep them as a manual stand by pump.
- All necessary electrical connections to the pump house

7.1 PUMP HOUSE AND POTABLE-WATER STORAGE TANKS

A. All construction shall respect designs attached.
B. Reinforced concrete works shall respect the prescriptions of Section 3.4.
C. All necessary piping for electrical supply and lighting into the pump house must be embedded in the concrete work.
D. A floor drain must be planted at the floor of the pump house to give allowances for drainage of both fire and water tank when need be.
E. All necessary piping connections for domestic water tanks and fire tank must be done in accordance to designs.
F. Install ladder for accessing water pump house as shown on designs.
G. Power signals and control wiring for the walls of tank

GENERAL

7.1.1 ACTION SUBMITTALS

A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

B. Glaze aluminum windows in the factory.

C. Weather strip each operable sash to provide weather tight installation.

D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

E. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.

F. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.

G. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

H. Inside and outside window should be properly done to maintain and isolation transition layer on the counter as shown on plans.

ALUMINUM FINISHES

A. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

E. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

F. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

G. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

14.7 EXTRACTOR INSTALLATION

A. See **Division 15**

14.8 WALL CLADDING ON THE SERVER ROOM WALL

PRODUCTS

14.8.1 PVC STRIP WALL CLADDING

A. Unless otherwise indicated wood used shall be of the type SAPELI or equivalent approved by the consultant from the Cameroon market
B. Wood structure shall be cut to dimensions of at least 25 mm by 25 mm and not greater than 30 mm by 30 mm and nailed to the existing wall of the server room as shown in details.
C. Wall PVC Strip shall be used to nail a false wall on the structure in B above.
D. Provide a PVC Strip at the base of the wall
E. All wood used shall be treated with an approved treatment product according to the Codes applicable in Cameroon
F. Weep holes with PVC pipes at the ends of wall cladding on both sides install at distances of not greater than 50 cm along the wall to allow circulation of air into this area. For this drill through existing CMU wall at the edges of wall cladding install weep holes with PVC diameter 20 mm and to all necessary finishing on the wall surface at this area. Pipes shall not extern beyond wall surface for esthetic reasons.

DIVISION 15: PATIENT ROOMS AND COURT YARD

15.1 SUMMARY

- Create PVC Strip wall cladding to solve damp proofing problems and paint to match color of room.
- Install Individual curtain.
- Install exhaust fan extractors as shown in plans in the noted rooms.
- Supply and cable electricity to all these rooms
- Install VAV system fresh air into the courtyard as shown on the plans
- Cable new lines to connect new fan installations

15.2 PLYWOOD WALL CLADDING

A. See section 14.8 with the exception that weep holes are install on front façade walls to allow air into the air gab between the wall cladding and the existing wall.

15.3 INDIVIDUAL CURTAIN/DRAP IN PATIENT ROOMS

PART 1 - GENERAL

15.3.1.SUMMARY

A. Section Includes:

1. Curtains.
2. Curtain tracks.

15.3.2.ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Curtain Tracks: Include maximum weights of Curtain that can be supported.

C. Samples: As follows:

1. Curtain Tracks with carriers, controls, and accessories.
2. Curtain Fabrics: For each color and pattern indicated, full width and with specified textile treatments applied. Show complete pattern repeat if any. Mark top and face of fabric.

3. Textile Trims: For each color and pattern indicated
4. Curtain Fabrication: For each heading, fabric, color, and pattern indicated, a complete full size panel to verify details of fabrication and thread colors. Maintain same color and texture in each room.

15.3.3.QUALITY ASSURANCE

A. Installer Qualifications: For curtain and curtain tracks, fabricator of curtain.

PART 2 - PRODUCTS

15.3.4.CURTAIN TRACKS

A. Manually Operated Track:
   1. Construction: Extruded aluminum, slotted for mounting at interval of not more than 610 mm o.c.
      a. Lengths and Configurations: Not more than 450 mm
      b. Support Capability: Weight of curtain indicated mounted on track length indicated.
      c. Finish : Manufacturer's standard.
   2. Mounting Brackets: Aluminum, of type suitable for fastening track to surface indicated and designed to support weight of track assembly and curtain plus force applied to operate track.
      a. Size : Ajustable.
   3. Installation Fasteners: Use already existing fasteners on the field.
   4. Operation: Cord tension pulley complying with WCMA A 100.1.
      a. Pulley Mounting Location: Wall.
      b. Draw: Two way, center opening.
      c. Operating Hardware Location: On stack.
   5. Carriers: Rollers with hooks Coordinate with curtain headings indicated.
      a. Master Carriers: Overlap.
   6. End Stops: Manufacturer's standard.
   7. Pulleys: Heavy duty.
   8. Accessories: As required for the proper operation of the Drapery.

15.3.5.CURTAIN

D. Product Data: Include rated capacities, accessories, appurtenances, and furnished specialties for each surface water-storage tank indicated.

E. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details for each surface water-storage tank, including the following:

1. Tank, roof, and shell openings.
2. Safety railings and ladders.
3. Plans, elevations, sections, details, and attachments to other work.
4. Structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
5. Power, signal, and control wiring.

7.1.2 INFORMATIONAL SUBMITTALS

C. Qualification Data : For fabrication.

D. Bacteriological test results.

E. Field quality-control test reports.

7.1.3 QUALITY ASSURANCE

A. Fabricator Qualifications: Employ a qualified structural engineer to prepare calculations, Shop Drawings, and other structural data for fabrication and erection of surface water-storage tank/ pump house.

1. Engineering Responsibility: Preparation of data for surface water-storage tanks, accessories, specified appurtenances, and concrete supports and foundations, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

PRODUCTS

7.1.4 GRP /GLASS REINFORCED PLASTIC/ WATER TANKS

A. Description: GRP Panels, bolts & rods shall be fabricated according to AWWA D100, AWWA M42, and NFPA 22 or approved standard.

1. Capacity: 5000l, 3 in number for domestic water

2. Range of Head: from lower capacity level to overflow level approx.1.5 meter.
3. Pipe Connection: Match size of water-distribution pipe.
4. Over flow Piping: PVC Schedule 40.
5. Roof Hatch: GRP Panel, hinged cover, 500 by 500 mm minimum all as per manufacturer recommendation.
6. Tank Vent: PVC pipe with stainless-steel screen, constructed to prevent entrance of rain, insects, birds, and animals
7. Foundation: Reinforced concrete. Refer to Section 3.4. Cast-in-Place Concrete."

7.1.5 SURFACE WATER-STORAGE TANK APPURTENANCES

A.Maximum Water-Level Controls: Automatic controls with mechanical float valve.

7.1.6 CONNECTIONS

A. Connect tanks to water-distribution piping.

B. Connect drains to storm-drainage piping.

7.1.7 WATER-STORAGE TANK APPURTENANCE INSTALLATION

A. Install and adjust water-level control valves, water control switches to protect dry running of the booster pump, piping, and alarms.

7.1.8 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified testing agency to perform the following field quality control testing:

1. Leak Test: Comply with AWWA D103 and NFPA 22 or requirements of authorities having jurisdiction. Fill tanks with potable water and test for leaks after installation. Repair leaks and retest until no leaks exist.

   a. Water will be furnished by Owner.

2. Leak Test: Comply with AWWA D115 and NFPA 22 or requirements of authorities having jurisdiction. Fill tanks with potable water and test for leaks after installation. Repair leaks and retest until no leaks exist.

   a. Water will be furnished by Owner.

3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B.Remove and replace malfunctioning units and retest as specified above.

7.1.9 CLEANING

A. Clean interior and exterior of surface water-storage tanks.

B. Disinfect surface water-storage tanks according to AWWA C652 or requirements of authorities having jurisdiction.

7.2 WATER PACKAGED BOOSTER PUMPS

GENERAL

7.2.1 SUMMARY

A. Section Includes:
1. Multiplex, variable-speed booster pumps.

7.2.2 DEFINITIONS AND TYPES

A. VFC: Variable-frequency controller(s).
B. Type Wilo, Salmson or equivalent

7.2.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, and dimensions of individual components and profiles. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For booster pumps. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: For power, signal, and control wiring.

7.2.4 INFORMATIONAL SUBMITTALS

ZIP Code : N/A

Address : P.O. Box 35415, Yaounde, Cameroon

Website : https://www.koica.go.kr/sites/cmr_kr/index.do

Telephone : +237 2 22 20 71 44

Remodeling Works for CURY and NTTPDC

in Yaounde, Cameroon

Bid Document

- Invitation No. : 2024-0001
- Bid Title : Remodeling Works for CURY and NTTPDC in Yaounde, Cameroon
- Employer : KOICA Cameroon Office
- Deadline : Friday, 22nd March 2024 / 16:00

The Bidders shall prepare for the application after reading and fully understanding the content and conditions of this document. For more information about this bid, please contact the person in charge stated below.

O Inquiries

- About bid procedures : Deputy Director Seo, cameroon@koica.go.kr

- About the construction : wonchul.kim@junglim.com / jin.cha@junglim.com

KOICA Cameroon Office

This Bid Document comprises the following documents.

The Bidders shall be responsible for any missteps and incidences that may occur owing to their failure to fully understand the requirements and conditions specified in this Bid Document.

Section 7 – Employer requirement & SOW

PART Ⅲ Conditions of Contract and Contract Forms

Section 8 – General Conditions of Contract

Section 9 – Special Conditions of Contract

(KOICA Safety Management Manual)

Section 10 – Contract Forms

[Section 1] Instructions to Bidders (ITB)

(Separately attached)

[Section 2] Bid Date Sheet (BDS)

Bid Data Sheet

The KOICA(Korea International Cooperation Agency) Cameroon Office kindly requests the submission of your offer for [Remodeling works] for (CURY and NTTPDC in Cameroon).

Date: 5th February 2024

Employer: KOICA Cameroon Office

< Notice >

◈ The Bidders certify that they will keep conditions of the Integrity Pledge in the course of making or accepting this bid or signing or performing the contract (and even after the completion of the relevant project or the delivery of goods). The Bidders shall submit the Integrity Pledge signed by the Bidders when the Bidders submits a written bid.

◈ The Bidders must not engage in any unfair trade practices, including (without limitation) colluding on the bid price or helping a specific Bidder win the bid. Where such unfair trade practices are found during the procedures, the Bidders shall report them immediately to the KOICA Cameroon Office. (cameroon@koica.go.kr)

◈ If any employee of KOICA requests a gift, a food item or a favor unrelated to the work specified in this bid, the Bidders must decline such a request and make a report to the KOICA Audit Office. (clean@koica.go.kr)

1. Brief of Bidding

1.a

. Invitation No.	2024-0001	(L2024-00002-1)
. Bid Title	*Remodeling works for Yaounde Emergency center(CURY)*	
. Summary of Construction		
- Location	*VGC6+52Q, Yaoundé, Cameroon*	
- Programme	*Emergency center*	
- Scale	*GF-2F*	
- Site area	*3,064m²*	
- Gross floor area	*2,069m²*	
- Structure	*reinforced concrete construction*	
- Scope of Works	*remodeling (Demarcation for scope of work_section.7.a)* *- Waterproofing work and installation of sanitary ware, plumbing repair, and replacement inside CURY facilities.* *- Removal of contamination on deteriorated walls, and maintenance work such as repainting, tiling, door installation, lighting, etc.* *- Civil drainage construction within the complex.* *- Relocation of guardian waiting area, development of external open space, and construction of drainage systems.* *- Maintenance work for the generator room, incineration facility, and replacement/installation of firefighting equipment, pumps, HVAC, etc.*	
- Scheduled Construction Period	*180 days*	

KOREA INTERNATIONAL COOPERATION AGENCY 한국국제협력단

. Duration	*Until 180 days from the date of signing the contract* *(Shall commence within 30 days from the date of signing the contract)*
. Project Budget	*USD 370,000* *(Be exclusive of VAT and other applicable indirect taxes)*

1.b

. Invitation No.	2024-0001	(L2024-00002-1)
. Bid Title	Remodeling works for National Trainer Training and Program Development Center (NTTPDC) in Cameroon	
. Summary of Construction		
- Location	VG57+V9W, Unnamed Rd, Yaoundé, Cameroon	
- Programme	National institute for vocational trainers and program development	
- Scope of Works	remodeling (Demarcation for scope of work_section.7.b) - Removal and reinstallation of waterproofing on the rooftop, surface cleaning, and replacement of drainage pipes. - Reconstruction and replacement of damaged areas on both interior and exterior walls, along with paint restoration for contaminated sections. - Elevator maintenance. - Replacement of electrical consumables such as panels and batteries, etc.	
- Scale	B2F-2F	
- Site area	5,000m²	
- Gross floor area	2,686.30m²	
- Structure	reinforced concrete construction	

- Scheduled Construction Period	180 days
. Duration	Until 180 days from the date of signing the contract (Shall commence 30 days from the date of signing the contract)
. Project Budget	USD 107,000 (Be exclusive of VAT and other applicable indirect taxes)

o Name of Currency : United States Dollar (USD)

o KOICA has no responsibility in any matters in regards to taxes, including VAT. Tax collection and refund will be managed by the relevant laws and regulations in place in Cameroon.

2. Bid Type, Selection of the Successful Bidders

(a) Bid Type : International Bidding, Open Competitive Bidding

(b) Selection of the Successful Bidders : Post-qualification

o Based upon bid prices which shall be below the Estimated Price, but above the floor price of 87.745% of the Project Budget, the Qualification Examination will be conducted.

o Selection as successful bidder is determined, when the overall grade is higher than 95 points (the passing grade).

o Qualification examination will be conducted in accordance with the 「Standards of Qualification Examination for Selection of Constructor」(Sept. 7, 2023).

3. Bidders' Qualifications

The Bidders must:

(a) Have submitted a bid application on or before the Application Submission Deadline.

(b) Must be a legally registered company.

(c) Have a valid registration to perform construction works in Cameroon.

- ① Commercial Registration Certificate accompanied by the updated statutes
- ② Tax Payment Confirmation
- ③ Certificate of Liabilities

(d) Past performance

- Must have performed at least one (1) similar project valued at not less than USD 100,000 in the past ten years (2014-2023).

* Similar Project is medical facilities, research facilities, educational facilities of similar facilities.

* The exchange rate will be applied at the time of completion

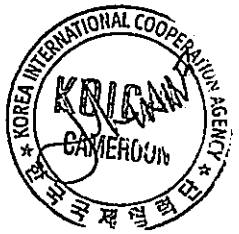
(e) Anyone who have records of sanctions and penalties imposed by an international organization or the government of Cameroon is ineligible to apply.

- If the Bidders is on any of the international organization ineligibility lists
- If no such lists or documents are available, the Bidders shall submit a pledge that they have never been sanctioned or penalized by an international organization or the government of Cameroon. Where the pledge is found to be false, the Employer shall reserve rights to terminate the contract at anytime.

(f) (If the Bidders is a citizen or a corporation incorporated in Korea) In accordance with the 「National Contract Act」, 「Local Contract Act」, or 「Act on the Operation of Public Institutions」 of the Republic of Korea, a person who is a fraudulent business entity who has been restricted from participating in bidding and is in the disposition period, cannot participate in the bidding.

- Korea ON-Line E-Procurement System

(g) According to domestic and foreign laws and regulations, anyone convicted of a bribery-related crime cannot participate in the bidding.



- Declaration of Anti-corruption

(h) The Bidders will not offer or receive money, goods, entertainment, or any other benefit directly or indirectly in the course of making or accepting a bid or signing or performing a contract (and even after the completion of the relevant project or the delivery of goods).

- Integrity Pledge

(i) The Bidders shall remain committed by their offers from the deadline for the submission of tenders till April 08, 2024.

※ Whenever required by the Employer, the Bidders shall be able to present their eligibility in manners that are satisfactory to the Employer.

4. Joint Venture(JV) is NOT allowed

5. Bidding Schedule

Schedule	Time and Date	Place
Bid Announcement	February 05, 2024	-
Application for bidding	Until February 16, 2024 16:00	E-mail or KOICA Cameroon Office
Pre-Bid meeting & Site visit	February 19, 2024 10:00	KOICA Cameroon Office
	February 19, 2024 14:00	CURY and NTTPDC SITE
Submission Deadline	Until March 22, 2024 16:00	KOICA Cameroon Office
Bid Opening Date	March 25, 2024	
Bid Evaluation	March 26~April 4, 2024	
Contract Award	April 8, 2024	
Contract Signing	April 15, 2024	(expected date)

(a) Application for bidding

o The Bidders are requested to send Employer an email confirming bidder's interest at cameroon@koica.go.kr.

- submit bidder's application electronically to Employer: cameroon@koica.go.kr with the subject line "Remodeling Works for CURY and NTTPDC in Yaounde, Cameroon".

o Time and Date : Friday, 16 February 16:00

o Place : cameroon@koica.go.kr

o Documents

- a duly completed bid application form (in the prescribed form)

: Preliminary Examination (on a Pass/Fail basis)

- a duly completed bid application form (in the prescribed form);
- a set of documents proving the applicant's eligibility to participate in the bid;
- documents proving the authenticity of the applicant's signature or seal; and
- any other documents specified in the Bid Data Sheet

(b) Pre-Bid meeting

: The participation in the pre-bid meeting is not a requirement. however, we encourage attendance at the site visit for a comprehensive understanding of the project.

o Time and Date : Monday, 19 February 10:00

o Place : KOICA Cameroon Office

o Site Visit : Monday, 19 February 14:00

- Employer will organize a site visit.
- If deemed necessary and appropriate, the Bidders may arrange a visit to the site at their own costs in consultation with the Employer.

(c) Inquiries

o Any inquiries about this bid, must be sent in writing. Inquiries through other means will not be accepted.

- E-mail address : cameroon@koica.go.kr
- CC : wonchul.kim@junglim.com, jin.cha@junglim.com

o Inquiry period : 2024.02.19.~2024.02.21

o Response : 2024.02.23

o Responses to the inquires will be posted on the E-mail

(d) Bid security

o The Bidders shall submit the bid security in any of the following forms;

- an unconditional bank guarantee (in the prescribed form);
- an irrevocable letter or credit; or
- a cashier's or certified check;

o All bids must be accompanied by a bid security of not less than five percent (5%) of the Total Bid Price.

o The bid security must be valid from the Bid submission date to at least 30 days after the Bid Submission Deadline.

o If the successful Bidder fails to sign the Contract, the bid security may be forfeited or the Bid Securing Declaration executed.

(e) Submission of bid

o All documents should be submitted in a sealed envelope (with the official seal/signature of the bidder).

o All documents should be submitted to the designated place mentioned below in person.

o Submission deadline(Time, date) : Friday, 22 March 16:00

o Submission place : KOICA Cameroon Office (P.O. Box 35415 Yaounde, Cameroon)

KOREA INTERNATIONAL COOPERATION AGENCY KOICA CAMEROON

- Telephone : +237-222-20-71-44

(i) Submission of bid price(in a separate sealed envelope) : Lump Sum Price

o The bidders shall present a bid price using the prescribed form and sign it before submission.

o Only the successful bidder shall provide the priced Bill of Quantities along with the commencement report.

o Safety Management Costs

- At least 0.5% of total construction cost minus provisional sums.
- The actual spending of safety Management Costs must be settled afterwards.

o Provisional Sums

- 10% of total construction costs.
- Provisional sums may be used, in whole or in part, only under the instructions of Employer.

(ii) Submission of documents

o Each one (1) copy of the written evidence listed below.

- Each document must be provided in its original from or if a copy is provided, the copy must be confirmed to be a true and accurate copy of the original document and must be signed or affix its registered seal.

Documents for Submission
① bidder's information sheet (in the prescribed form)
② bid security (in the prescribed form)
③ documents evidencing the authenticity of the applicant's signature or seal power of attorney

KOREA INTERNATIONAL COOPERATION AGENCY KOICA CAMEROON 한국국제협력단

④ one set of documents evidencing the applicant's eligibility to participate in the Bid - written confirmation authorizing the signatory of the Bid to commit the Bidder - Latest/valid Certificate of business Registration. - Copy of valid registration issued demonstrating bidder is eligible/authorized to provide construction works services in Cameroon. - Attestation of taxpayers registration - Certificate of non indebtedness - Attestation of non-bankruptcy - Certificate of non-exclusion from public contracts - Performance Certificate of one (1) similar project of not less than USD 100,000 in the past ten years (2014-2023) ※ The exchange rate will be applied at the time of completion)
⑤ Declaration of Anti-corruption in ODA Business Participation (in the prescribed form) The Bidder is on any of the international organization ineligibility lists or pledge
⑥ Integrity Pledge (in the prescribed form)
⑦ materials of qualification examination (in the prescribed form) - List and value of contracts for the last ten years of the same type projects plus client's contract details (name and email address) who may be contracted for further information on those contracts. - Audited financial statements including income statement and balance sheet for the last 5 Financial Years (2019-2023). Prove of financial caution ※ Evaluation and Qualification Criteria duly completed and signed and in accordance with Annex 1 ※ The rates of exchange shall be the selling rates 28 days prior to the deadline for submission of bids published by the local central bank.
⑧ sealed bid price duly completed and signed (in the prescribed form)
⑨ Project Execution Plan (Construction Declaration) ※ No obligation to submit when participating in the bid. However, submission is required upon contract signing (within 7 days from the bidder notification). - Master Schedule and Construction Management Plan

- Site organizational chart and manpower deployment plan - Equipment deployment plan (Including documents related to construction company-owned equipment and leased equipment) - Appointment plan for safety manager - Site establishment plan (Site fence, field office, field laboratory, etc.) - Quality Management Plan (Quality Control) - Material delivery plan for all construction types, major material approval, and - Shop Drawings approval request plan - Other proposals for ensuring quality
⑩ any other documents specified in the Bid Data Sheet.

(f) **Estimated Price** (Decision of Estimated price)

o KOICA will prepare fifteen sealed envelopes of different number of Estimated Price.

o Each number (figure) in the envelopes is randomly decided within the range of ±2.5% of the projected Estimated Price.

o Bidders will choose four envelopes. The average of chosen numbers will be the final Estimated Price.

o The final Estimated Price should not exceed Project Budget.

(g) Bid Opening

o Time, date of opening : Monday, 25 March 10:00

o Place of Opening(Address) : KOICA Cameroon Office

※ Such bid opening may be attended by Bidders or their representatives.

(h) Evaluation Criteria

o The evaluation method will be as specified in Annex 1 (Evaluation Criteria)

6. Nullification of Bids

o In accordance with the Article 20 of 「KOICA Instructions to Bidders」 and the Article 20 of 「KOICA Regulations for International Procurement」, this bid may be nullified.

7. Other Matters

o The bidders shall adhere to all the requirements of this Bid Document, including any amendments made in writing by Employer. (This Bid Document is in accordance with the KOICA Laws on Contracts and Procurement.)

o Regardless of the bid result Employer shall not be responsible for any costs spent by the bidders to prepare for this bid.

o Quotations shall be done in United States Dollar (USD).

o The bidder shall submit only one Bid.

o The language of the bid is English. If the French version is different from the English version, the English version shall take precedence.

o Please check the Email or KOICA Cameroon Office website. This will enable you to receive amendments or updates to this bid.

Annex 1: Evaluation Criteria

Evaluation Criteria

1. Technical Ability Evaluation (20)

(a) Construction Experience (10)

Construction Experience	Distribution (Score)	Remarks
Records of performance of the similar projects as the project concerned in the past ten years (2014-2023)	(Total amount of records of performance of the similar projects as the project concerned in the past ten years / Evaluation Base Price) × 100 * scored on a percentage basis and given the corresponding Grade A: above 100%: 10.0 B: above 90%: 9.0 C: above 80%: 8.0 D: above 70%: 7.0 E: above 60%: 6.0 F: under 60%: 5.0	☞ Evaluation Base Price: USD 477,000 ☞ Each project must have performed similar projects of not less than USD 100,000 ☞ similar project: hospital / medical, research, educational facilities

※ Conversion to US Dollars

o The rates of exchange shall be the selling rates 28 days prior to the deadline for submission of bids published by the local central bank.

※ Documents

(i) List and value of contracts for the last ten years of the similar projects plus client's contract details (name and email address) who may be contacted for further information on those contracts.

- Performance Certificates

(b) Finances (10)

KOREA INTERNATIONAL COOPERATION AGENCY 한국국제협력단 KOICA CAMEROON

Item		Distribution	Grade	score
Financial capabilities	• Letter of an acredited Commercial Bank declaring that the Construction Contractor has access to financial resources • Baseline : USD 100,000	4	A. above 200%	4.0
			B. 150%≤X<200%	3.6
			C. 100%≤X<150%	3.2
			D. 80%≤X<100%	2.8
			E. under 80%	2.4
Average Annual construction turnover	• Audit Report of the value of annual turnover for the last 5[1] years registered in the approved account annual report • Baseline : USD 100,000	4	A. above 200%	4.0
			B. 150%≤Y<200%	3.6
			C. 100%≤Y<150%	3.2
			D. 80%≤Y<100%	2.8
			E. under 80%	2.4
Business operating period		2	A. More than 5 years	2.0
			B. 1 - 5 years	1.8
			C. Less than 1 year	1.6
summary		10		

※ Note 1) : Recent 5-year completion records as of the bid announcement date

※ Documents

o Must reflect the finances of the Bidder, and not sister or parent companies.

o Past financial statements must be audited by a certified public accountant.

o Past financial statements must correspond to accounting periods already completed and audited. No statements for partial periods shall be accepted.

2. Price Evaluation (80)

$$80 - 20 \times | (88/100 - \text{Bidding Price}/\text{Estimated Price}) \times 100 | = \text{Bid Score}$$

o | | : Absolute value

o If, value of "Bidding Price/Estimated Price" has decimal points, it is rounded up to the four decimals.

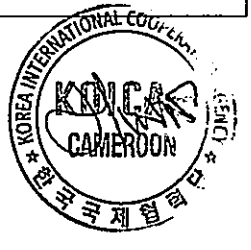
o If the bidder's Bidding Price is 88.25% or above of the Estimated Price, the bidder will get 75 score for the price evaluation. (Only for the bidders whose Bidding Price is lower than the Estimated Price)

o Minimum Score is 2.0

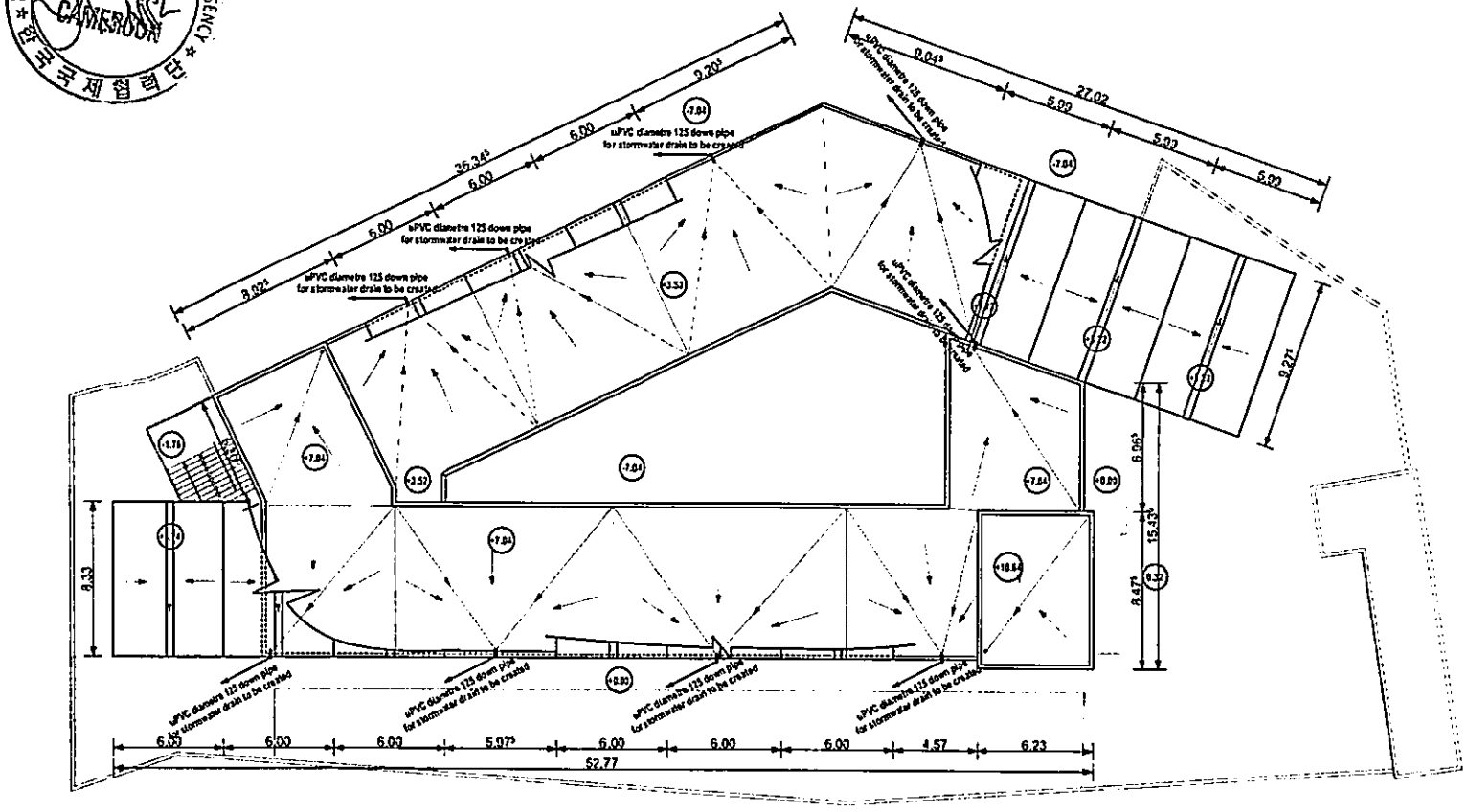
Annex 2: Contract Data

Contract Data

Employer's name and address	name: address:
Engineer's name and address	name: address:
Time for Completion	180 days
Defect Notification Period(DNP)	1 years
Governing Law	
Ruling language	English
Language for communications	English
Performance Security	The performance security will be in the form of an unconditional bank guarantee in the amount(s) of 15% of the Contract Price.
Delay damages for the Works	0.05% of the final Contract Price per day, in the currencies in which the Contract Price is payable.
Maximum amount of delay damages	15% of the final Contract Price.
Provisional Sums	10%
Adjustments for changes in Cost	not applicable
Total advance payment	30% of the Accepted Contract Amount payable in the currencies in which the Accepted Contract Amount is payable. (shall be adjustable)
Percentage of Retention	3% (Issuance of Retention or Defects Liability Bond)
insurance required for the Works	Contract submission must occur within the first two weeks after the contract is awarded.
other insurances required by Laws and by local practices (give details)	1. Civil liability insurance 2. Accident Insurance 3. All risk insurance



International arbitration	International arbitration shall be: (i) Administered by: [Korean Commercial Arbitration Board] (ii) Conducted in accordance with the rules of: [International Arbitration Rules of the Korean Commercial Arbitration Board]



KOICA
Korea International Cooperation Agency

VTC
Yaounde Vocational Training Center

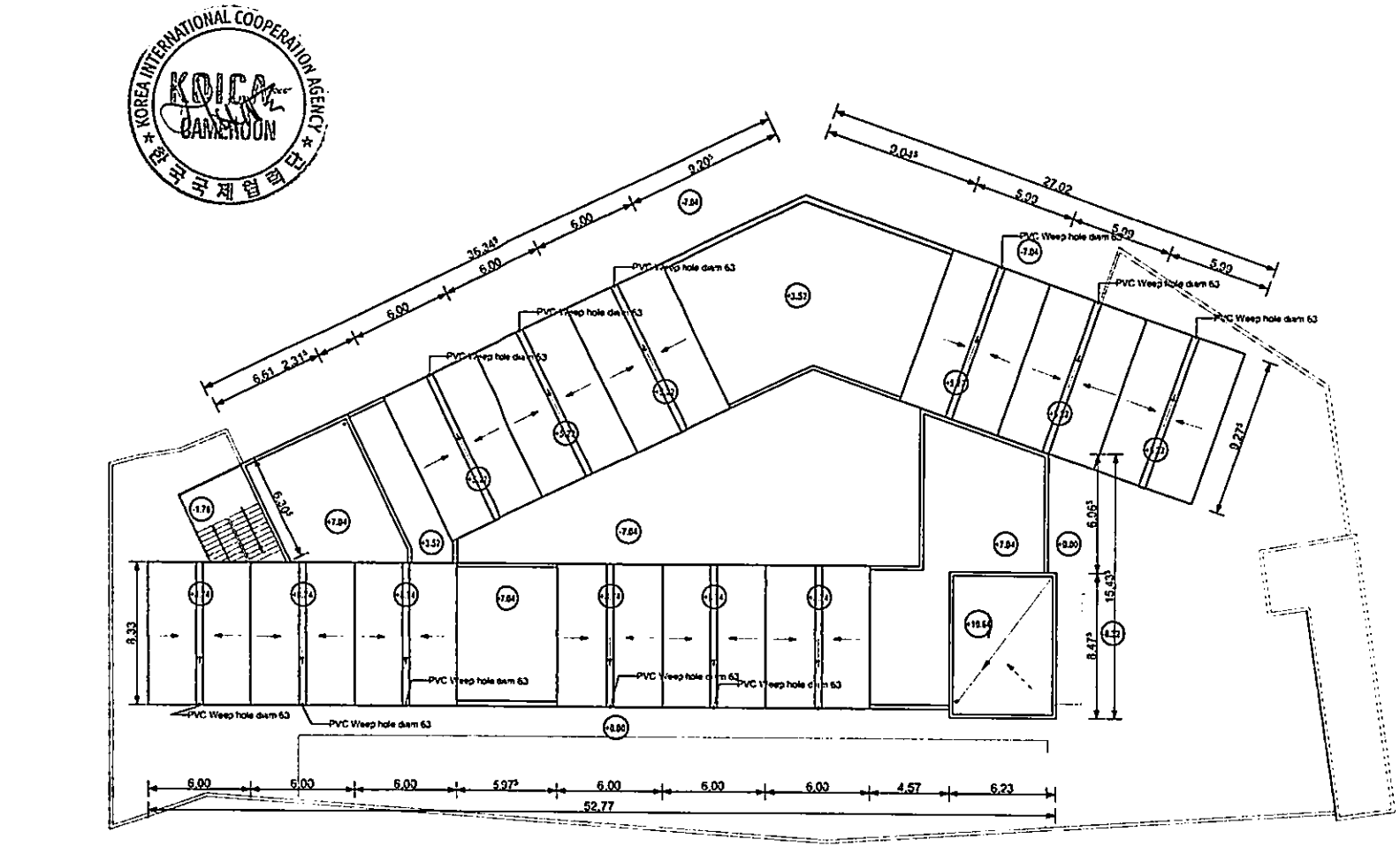
REFURBISHMENT PROJECT OF THE YAOUNDE VOCATIONAL TRAINING CENTER

100% MASTER DESIGN

13-11-2023

DIV 1

ACCESSIBLE TERRACE



KOICA
Korea International Cooperation Agency

VTC
Yaounde Vocational Training Center

REHABILITATION PROJECT OF THE YAOUNDE VOCATIONAL TRAINING CENTER

100% MASTER DESIGN

Mark	Date Modified	Observation

Date Published: 13-11-2023

Drawing Number: DIV 2

NON ACCESSIBLE TERRACE

The Scope of Works

DEMARCATION TABLE for SCOPE OF WORKS						
Description		**Works**	**Items**	**BOQ**	**DWG**	**Note**
INTERIOR OFFICE BUILDOUT						
ACCESSIBLE TERRACE	DIV 1	CIVIL Redo sand screed on entire surface	Demolition of existing roof slope at the entire surface of the accessible roof. Disposal of demolished material to an area approved by the City Counsel Sand Screed: Sand screed with a slope of at least 1% towards the roof drain in the entire accessible terrace. Screed should consist of a hydraulic cement binder to improve its water proofing.		Accessible terrace	Slope of at least 1%.
		WATERPROOFING	Do a layer of waterproofing (MONOCOUCHE) consisting of a primer layer of type SOPRADERE EMULSION and a sub layer membrane of type SOPRALENE FLAM 180 along the entire surface of accessible terrace and on internal parapet walls and coping over parapet to include all necessary material needed for placing.		Accessible Terrace	
		MECHANICAL Drainage of Roof	Create floor drains at areas shown on the plan with a down pipe of normalized uPVC 100 anchored along the angle of the Pillars in the elevations to drain water from roof.		Accessible Terrace	
PAINTING	DIV 2	INTERNAL AND EXTERNAL	Treat contaminated areas of the staircase walls and slabs. Repaint internal surface as directed by the project manager to meet up the quantity provided in the BOQ. Treat contaminated paint areas on external walls and paint.			
EQUIPMENT	DIV 3	Equipment Repairs	Repair test and commission elevator for smooth functionality. Replace battery for the generator ignition system, replace water pump panels			

KOICA CAMEROUN
KOREA INTERNATIONAL COOPERATION AGENCY

YAOUNDE VOCATIONAL TRAINING CENTER

KOICA
Korea International
Cooperation Agency

VTC

Yaoundé Vocational Training Center

REFURBISHMENT PROJECT OF THE YAOUNDE VOCATIONAL TRAING CENTER

100%

TECHNICAL SPECIFICATIONS

Table of Contents

SECTION 01 - GENERAL REQUIREMENTS

1.1. BRIEF DESCRIPTION OF THE PROJECT

Ethio ICT village expressed an interest to undertake office interior builtout construction project inside ICT park compound. The project consists of an office interior built out.

The project will provide various functions as follows

- The First Floor: Waiting and reception, leering center, meeting hall, cafeteria resting area.
- The Second Floor: offices, meeting rooms, pool offices small café, daycare.
-

1.2. SITE DESCRIPTION

The site is located in Bole Lemi sub-city, ICT PARK, Addis Ababa, Ethiopia.

1.3. CLIMATE

Addis Ababa is in the tropical zone and has a warm and dry climate for most part of the year.

1.4. QUALITY ASSURANCE

1.4.1. SUBMITTALS AND SUBSTITUTIONS

The minimum acceptable qualities of materials and workmanship have been established in this Specification. In each section requirements have been established for the advance submittal of data for review and approval.

In case the remark 'or similar manufacturer, to be approved by the project manager is added, the contractor is authorized to propose an equal product to be approved by the project manager. The specified product is used as an atheistically and technical reference for the possible alternative to be proposed.

1.4.2. CODES AND STANDARDS

A list of Codes and Standards referred to in this Specification is given in individual sections of this document. The whole of the design, materials, equipment, methods of construction and installation shall conform to the applicable standards.

Should there be any conflict between the Codes or Standards indicated, the more stringent Code or Standard shall govern.

Where a Code or Standard is referred to, that shall be the latest published edition thereof, unless otherwise stated. The use of other acceptable equivalent proved standards being used for the works requires the written approval of the Project manager.

KOREA INTERNATIONAL COOPERATION AGENCY KOICA CAMEROON

1.4.3. RELATED WORKS DESCRIBED ELSEWHERE

The Technical Specification has been divided into sections. In dealing with a section, works that are necessarily related to the section under consideration, but not included in that particular section are referred to under "Related Works Described Elsewhere". The reference to the works described elsewhere shall be considered as if the works have been described in that particular section and equally applicable as far as the work is related.

1.4.4. DRAWINGS

The drawings which form part of this Specification have been listed in Annex attached.

1.5. ABBREVIATION AND NOTATION

The following abbreviations and notations are used throughout this Specification. The abbreviations and notations shall be understood as having the meanings as given to them hereunder.

+	BaTCoDA	Building and Transport Construction Design Authority
+	BS EN	European Code of Practice
+	BS	British Standard
+	CP	British Standard Code of Practice
+	AS	American Standard
+	ASTM	American Society for Testing and Materials
+	AASHO	American Association of State Highway officials
+	ES	Ethiopian Standard
+	DES	Draft Ethiopian Standard
+	MWUD	Ministry of works and Urban Development

1.6. UNITS

In these Documents the metric system of measurement has been adopted and shall be used for the execution of the Works.

The international Code ISO 1000 "SI units and recommendations for the use of their multiples and of certain other units" issued by the International Organization for Standardization (ISO) is applicable.

1.7. LEVEL

The datum level is as indicated on the drawing of the Site. All levels are to be correlated to the datum level on site.

1.8. SURVEY OF ADJACENT STRUCTURES

Prior to the start of the execution of the Works a survey shall be executed - arranged by the Contractor - showing the condition of the existing and adjacent structures. The location of any defect found shall be determined and described and where applicable photographs are to be taken. The result is to be presented to the project manager in duplicate.

1.9. GUARANTEE FOR PARTS OF THE WORKS

The guarantees shall include:

o guarantee on the materials used;

o guarantee on the way of application;

o other factors determining the quality such as property, suitability, durability, solidity and reliability.

The guarantee starts on the day of the issue of the Taking-Over Certificate till the end of the indicated period of the guarantee.

1.9.1. CONDITIONS OF GUARANTEE

The Contractor shall provide a Certificate of Guarantee for those parts of the works for which a guarantee is required. The Certificates of Guarantee shall be submitted to the project manager, prior to the handing over of the works.

The following conditions are applicable:

- The Certificate of Guarantee shall be in accordance with the standard condition of contract, the text extended where required and be printed on paper provided with the logo of the guarantor.
- The guarantee shall be provided by the Contractor.
- In case the Certificate of Guarantee as indicated above not has been provided shall this never result in a cancellation or change of the obligations of the Contractor with regard to the guarantee to be provided.
- In case - to the opinion of the client- the guarantor does not fulfil his obligations regarding the guarantee shall the client be entitled to have required repairs in relation to the guarantee be executed by third parties, at the Contractor's expense. Also, in this situation shall this never result in a cancellation or change of the obligations of the Contractor regarding the guarantee to be provided.

END OF SECTION

2. SECTION 2 – ROOF SLOPE

2.1.1. GENERAL REQUIREMENT

2.1.1.1. WORK INCLUDED

Hack out and demolish all existing roof slopes on the entire accessible roof.

Provide cement, lime, aggregate, labor, equipment and tools for roof slopes as required for the satisfactory installation of the works.

2.1.1.3. QUALITY ASSURANCE

2.1.1.3.1. STANDARDS

Comply with the following standard

ES C D5 201 General Requirement, Portland cement, ESI

ES C D5 003 Hydrated lime, ESI.

BS 1198 Sand for roof slope.

ASTM C94 Mixing water for concrete.

ASTIM C 1369 Metal lathing for roof slope

2.1.1.3.2. QUALIFICATION OF WORK MEN

Pavers shall be skilled workmen who are thoroughly trained and experienced in the necessary crafts. In addition to these requirements assign at least one person who is thoroughly familiar with the specified requirements and capable of guiding the trades men in the selection of materials and execution of the works of this section.

2.1.1.3.3. SUBMITTALS

Submit product data for approval by the Project manager immediately after signature of agreement indicating the sources of cement, sand and aggregate.

Submit manufacturer's certificate showing properties of cement & lime. Submit test certificates for aggregate or carry out tests for the compliance of the aggregate to BS 1198 & BS. 1199.

2.1.1.3.4. COMPLIANCE

Compliance with the submittal, substitution and sampling sections of the General Requirements of this Specification.

2.1.1.3.5. DELIVERY AND STORAGE

Comply with the requirements of the delivery & Storage of described in the manufacturer's manual.

2.1.1.3.6. SAMPLES

Prior to the ordering of the building materials indicated below shall the Contractor arrange for a sample of the plaster work on different surfaces. The sample shall cover 2 m2 and be presented to the Project manager for consideration and approval.

2.1.1.3.7. START OF WORK

The Contractor shall inform the Project manager timely when the works are to start and when the next activity is scheduled to happen.

2.1.1.3.8. CRITERIA FOR THE JUDGEMENT OF SURFACES Slopes

Irregularities smaller than or equal to 1 mm are allowed.

The maximum allowed deviation in slope over a distance between two points are as follows:

distance:	2 ml	deviation:	3 mm;
"	4 ml	"	8 mm;
"	10 ml	"	12 mm;
"	15 ml	"	15 mm.

2.1.2. PRODUCTS

2.1.2.1. CEMENT

As per the manufacture instruction.

2.1.2.2. LIME

As per the manufacture instruction.

2.1.2.3. AGGREGATE

Aggregate for slopes shall be naturally occurring sand or crushed aggregate. The aggregate shall be hard, clean, free from adhered coating with no clay content.

Aggregate shall be free of harmful organic and inorganic material that may affect the setting, strength, durability and appearance of render or undercoat and material in contract with it.

The clay and fine silt content of aggregate shall not exceed 5% by weight.

The grading of aggregate for undercoats and fine costs shall comply with the requirements of BS 1199 Tables 1 & 2 respectively.

2.1.2.5. WATER

Comply with the requirement of water in the in situ cast concrete section of this Specification. Or any tap water.

2.1.2.7. MORTAR

Mix proportion

Refer to the Specification under execution for the mix proportion of each type of mortar.

Mixing mortar

The ingredients of mortar shall be measured in accurate gauge boxes for volume. Mortar shall be mixed in an approved mechanical batch mixer. Dry ingredients of mortar shall in the first instance, be mixed until there is a uniform consistency in color. Water shall be added and the mixing continued until there is a uniform distribution of the materials and the mass is uniform in color and consistency. In no case shall mixing be carried out for less than two minutes after adding water. Sufficient water shall be added to the mix to produce a pure consistency.

In instances where hand mixing in un-avoidable, the cement content shall the increased by 10%. The dry and wet mixes shall be turned over sufficient number of times to produce the respective consistencies as required by batch mixers.

Cement mortar shall be used within half hour of adding cement to the mix.

Compo-mortar shall be used within one hour of adding cement to the mix.

2.1.3. EXECUTION

2.1.3.1. GENERAL

Demolish all existing roof slopes on the entire surface of the roof

Surfaces to receive slope screed shall be thoroughly cleaned, inspected and wetted before application. Concrete surfaces shall be rubbed with cement slurry and angles of concrete & masonry surfaces dusted with cement to give additional strength.

All chases shall be cut out, services installed and chases made good prior to application of plaster, pointing and screed. Hacking on concrete and masonry surfaces shall be carried out by approved means.

Joints shall be raked out to a minimum depth of 10mm to form proper key if not specified under the respective masonry type to receive plaster or pointing finish.

Where making good screed is required, the surface shall be cut to a rectangular shape and the edges, cut out to form dovetail key. Cracks, blisters and other defects shall be cut out and made good.

Minimum slope of screed shall be 1%

Width of the strip shall be 150 mm and the width of the mesh 3 mm.

Screed containing cement shall be wetted for a minimum of seven days after the application of the coat.

The moisture content of the surface of the screed shall not be more than three percent by weight.

2.1.4. CLASSIFICATION PLASTER

WORK

2.1. ROOF FINISH

2.3.1. BITUMINOUS WATER PROOFING COAT

- **Product;** SOPRELENE or equivalent
- **Backing:** concrete
- **PRIMER;** SOPRADERE.

2.3.3. METHOD OF MEASUREMENT

Screed and waterproofing shall be measured flat with our addition for edges and returns.

Curved, spherical and conical surfaces shall be measured along the surface. internal

and external surfaces shall be measured separate.

The following are understood as included: -

- Preparing background like hacking, knocking out joints grouting bedding, jointing and key formation.
- All work in narrow widths, corners, angles & openings.

END OF SECTION

3. SECTION – WATER PROOFING

GENERAL REQUIREMENT

3.1.1.1. WORK INCLUDED

Provide primer layer and waterproofing coat, labor, equipment and tools for waterproofing of accessible area of roof as required.

QUALITY ASSURANCE

3.1.1.3.1. STANDARDS

Comply with the following standard

NF DTU 43.11

Cahier du CSTB 2267-2 de Septembre 1988

Cahier des Prescriptions Techniques communes « Support des Systèmes d'étanchéité de toitures dans les Départements et Régions d'Outre-Mer (DROM) »

Cahier de CSTB 3644 d'Octobre 2008

3.1.1.3.2. QUALIFICATION OF WORK MEN

The minimum slope admissible for the water proofing shall be 1%.

Execution must be done by specialized personnel train for this prupose by SOPREMA SAS. Special care must be taken during execution to avoid voids between water proofing and support.

3.1.1.3.3. SUBMITTALS

Submit product data for approval by the Project manager immediately after signature of agreement indicating the sources water proofing.

Submit manufacturer's certificate showing properties of product.

3.1.1.3.4. COMPLIANCE

Compliance with the submittal, substitution and sampling sections of the General Requirements of this Specification.

3.1.1.3.5. DELIVERY AND STORAGE

Comply with the requirements of the delivery & Storage of described in the manufacturer's manual.

3.1.1.3.6. SAMPLES

Prior to the ordering of the building materials indicated below shall the Contractor arrange for a sample of product to be presented. A mockup shall be made to cover 2 m2 and be presented to the Project manager for consideration and approval.

3.1.1.3.7. START OF WORK

The Contractor shall inform the Project manager timely when the works are to start and when the next activity is scheduled to happen.

3.1.2. PRODUCTS

3.1.2.1. PRIMER SOPRADERE: Bituminous base mixture and volatile solvent with additives to ameliorate binding to surface. Dry extract 40% in conformity to NF DTU serie 43

3.1.2.2. SOPRALENE FLAM 180 done respecting the technical data sheet "Elastophene Flam"

3.1.3. EXECUTION

3.1.3.1. GENERAL

Examine to make sure that surface is dry before application.

Proceed to apply a layer of SOPRADERE primer on the required surface

Heat and place SOPRALENE FLAM 180 sheets on primed surface. Make sure that there is a reasonable overlap between sheets as described in the technical data sheet. All other necessary requirement on the technical data sheet must be respected.

METHOD OF MEASUREMENT

Waterproofing shall be measured flat with our addition for vertical surfaces, edges and returns.

Curved, spherical and conical surfaces shall be measured along the surface. internal

and external surfaces shall be measured separate.

END OF SECTION

4. SECTION 04 - PAINTING

4.1. GENERAL REQUIREMENTS

4.1.1. WORK INCLUDED

Provide all backing and painting material, necessary labor and tools for the preparation, priming and painting of surfaces and cleaning up at work completion.

4.1.2. RELATED WORKS DESCRIBED ELSEWHERE

- Masonry Works Section 04
- Carpentry works Section 05
- Hardware Section 06
- Metal Work Section 07
- Finishing Section 08
- Glazing Section 10

4.1.3. STANDARDS

Comply with the following standards:

- Glue Size for decorators use BS 3357
- Lead based priming paints BS 2523
- Metallic Zinc rich priming paints BS 4652 • Mineral solvent for paints BS 245
- Ready mixed aluminum-priming paints BS 4756

4.1.4. QUALIFICATION OF WORK MEN

Painters shall be skilled workmen who are thoroughly trained and experienced in the necessary crafts. In addition to these requirements, assign at least one person who is thoroughly familiar with the specified requirements and capable of guiding the trade's men in the selection of materials and execution of the works of this section.

4.1.5. SUBMITTAL

Within a reasonable time and in any case prior to placement of order submit the following for approval:

- Manufacturers name of paint stating type of material, brand name, intended use, specification of paint coverage and other relevant data required to confirm compliance with the specific requirements.
- Recommended thinners and dryers and their method and proportion of use.

- Prior to ordering of any paint, a sample should be prepared - in consultation with and for approval by the project manager - of all the coatings and paintings intended to be applied.
- After completion of the Works maintenance instructions are to be submitted by the Contractor in duplicate to the project manager of all coating and painting applied
- The Contractor should submit this specification to the Project manager 8 weeks prior to the start of the painting works.
- The number of copies to be submitted is: 3 for approval; 3 after approval.

4.1.6. COMPLIANCE

Comply with the submittal, substitution and sampling section of the General Requirements Section of this specification.

4.1.7. PROTECTION

Use all means necessary to protect the materials of this work before, during and after installation and to protect the work and materials of other trade. Scaffolding, trestles, other erections and protection covers shall be placed to provide the maximum protection to the existing structure and to permit normal functioning, should area to be painted be under occupancy.

Catalogues showing the color, shed and application instructions and method of thinning and priming surface are to be submitted with the product.

Paint materials shall be stored in enclosed spaces, secured from fire risks.

Paint materials shall be stored on shelves, or ramps clearly off the ground.

Paint containers shall be stacked in a manner preventing damage to the containers and deterioration of paint materials. Pint materials shall remain sealed until use.

Opened container shall be closed tight to ensure sealed conditions if paint has been partially used.

4.2. PRODUCTS

4.2.1. GENERAL

The specification of products here under is a general guide for paints. The specification of the manufacturer approved by the Project manager shall govern for selection of material and coatings. Paint materials shall generally be obtained from approved suppliers only. Paint supplies shall be limited to the smallest possible number of manufacturers.

All supplies shall only be in their original packing and be provided with the manufacturer's label.

Surface sealers, primers and under coats shall generally be in accordance with the paint manufacturer's recommendation.

Paint strippers, abrasive papers, cleaning agents, etching solutions and fillers shall be as recommended by the paint manufacturer.

Paints shall be such that stirring produces a smooth uniform mixture which works well under brush.

4.2.2. GLUE

Glue for sizing for surfaces to receive paint shall comply with the requirements of BS 3357 and as recommended by the paints manufacturer depending on the surface to be sized.

4.2.3. PRIMING PAINTS

Oil based priming paints shall be applied to surfaces under ready mixed oil base paints or conventional hard gloss pints.

Aluminum priming paints for woodwork shall be for brush application. The primer shall comply with the requirements of BS 4756.

Metallic zinc rich priming paint complying with the requirements of BS 4652 shall be applied to iron and steel surfaces, which have been blast cleaned to ensure close electrical contact and for touching up damaged zinc coatings.

Primers shall be such that, they do not lose their property for a period of not less than six months in their original sealed conditions. The properties of oil based primers and the proportion of ingredients shall be as shown in the formulation table of HS 2523.

4.2.4. PLASTIC EMULSION PAINTS

Plastic emulsion paints shall be obtained from approved manufacturers.

Plastic emulsion paints shall be selected for interior and exterior work and where special applications of water proofing qualities are required.

4.2.5. SPECIAL PAINTS

Special paints like black board, traffic, quick drying lacquers, etc., shall be supplied from manufacturers approved by the Project manager.

The paints shall fully comply with the requirements of quick drying, high resistance, etc., as may be required for the intended purpose.

4.2.6. BINDERS

Binders to be used as primers or sealers shall be unpigmented emulsions consisting of resin containing neither oil nor plasticizers. Binders are to be diluted with water in the proportions directed by manufacturers.

4.2.7. THINNERS

Turpentine and white spirit for thinning paints shall comply with the requirements of BS 245 respectively. Water for thinning shall be clean potable water. Thinners shall be applied in the proportions recommended by manufacturers.

4.3. EXECUTION

4.3.1. GENERAL

Materials shall be prepared, mixed and applied in strict conformity with the manufacturer's instructions and as approved by the project manager.

Materials shall be well stirred before application to produce a mixture of uniform density as required during the application.

No painting shall be carried out when rain, fog, condensation is likely to occur, the relative humidity exceeds 85% or the surface to receive paint or primers is damp.

Definitions:

- "New surface" means a surface not painted before or only containing minor disintegrated.
- "Pre-treatment" means the preparation of the surface prior to the application of the first layer.
- "Film thickness" means the thickness of the dry applied layer or layers.

4.3.2. SURFACE PREPARATION AND PAINT APPLICATION

4.3.2.1. GENERAL

All work on which painting is to be applied shall be inspected for satisfactory installations to enable painting to start.

Surfaces to receive paint shall be cleaned of all oil, grease, loose and powdery material.

Surfaces to receive paint shall be sufficiently dried before the application of the paint.

All removable items fixed on surfaces to receive paint, but not receiving paints shall be removed before application and re-installed after completion of work.

4.3.2.2. TEXTURED SAND ROUGH SURFACE

Mortar droppings and nips shall be removed and defects made good. Efflorescence shall be brushed off as it appears and all decoration deferred until it ceases. The application of paints shall be delayed until thorough or sufficient drying has taken place.

4.3.2.3. SMOOTH MASONRY AND CONCRETE SURFACES

The surface shall be washed down, where directed, with warm water and detergent, and allowed to dry. The quantity of water shall be kept to the minimum to ensure that wetting is on the surface only. Minor defects, cracks and holes, after cutting out as necessary, shall be made good as appropriate and rubbed down flush with the surrounding surface. Efflorescence shall be brushed off as it appears and all decoration deferred until it ceases. The application of paints shall be delayed until thorough drying has taken place.

4.3.2.4. WOODEN SURFACES

All wooden surfaces shall be rubbed down smooth with fine abrasive, and dusted off; Sound knots, resinous streaks and bluish sapwood shall be given 2 coats of knotting which shall extend at least 25mm around the affected area. Nails shall be punched well below the surface. After priming, defects such as open joints or nail holes shall be stopped with heard stopping, and surface imperfections faced up as necessary. All such repairs shall be primed before undercoating is applied.

Surface to be varnished shall be rubbed down thoroughly and evenly with fine abrasive paper and filled as necessary. Filling shall be with approved wood filler, tinted to match the color of the wood, rubbed down and dusted off. Varnish shall be applied in three coats, the first coat thinned with 25% of white spirit. When dry the first coat shall be lightly rubbed down with fine abrasive paper.

Surfaces to be treated with clear wood finish shall be rubbed down evenly with fine abrasive paper and filled as necessary. Filling shall be with approved wood filler tinted to match the color of the wood, rubbed down and dusted off. Three coats of approved clear finish shall be applied, the first in the joiners shop where practicable, and two further coats immediately after fixing but before any deterioration of the first coat. The manufacturer's directions shall be adhered to in all respects including proportioning, mixing, temperature for application, and curing, where directed, the finished work shall be matted down wet, rinse, dried, and a high gloss produced with approved rubbing compound or matted to a satin finish.

4.3.2.5. IRON AND STEEL WORK

Bare iron and steel work including sheeting and pipes shall be thoroughly prepared by removing all dirt, rust and loose mill scale to approval.

Painting shall be carried on after all hardware & ironmongery is removed.

Blasted surfaces shall be brushed or cleaned by vacuum to the cleaning level SA 1/2 (ISO 8501-1). They shall not be touched by hand or contaminated in any other way. Surfaces shall be protected within 4 hours of having been blast cleaned. Sample blast adequately protected by sealed clean polyethylene warping, shall be submitted for approval before any work is put in hand. The approved sample shall then be retained by the Project manager for comparison with the prepared steel work.

Mechanical cleaning shall be carried out by power driven tools, such as carbon drum grinding discs, chipping hammers and needle guns, followed by steel-wire brushing and

dusting to remove all loosened material. Excessive burnishing of the metal through prolonged application of rotary wire brush shall be avoided. Surfaces shall be protected within 4 hours of having been mechanically cleaned.

4.3.2.6. NEW GALVANISED SURFACES

New galvanized surfaces shall be thoroughly cleaned to remove all dirt, oil and grease and pre-treated with either an etching primer or approved etching compound.

4.3.2.7. PAINTED SURFACES

Painted surfaces shall be cleaned by removing old paints or cleaning the surfaces as specified. Removing, undercoats shall be applied evenly over the whole surface to give a solid film, care being taken to avoid uneven thickness of paint at edge and angles.

4.3.2.8. FINISHING COAT

Finishing coats shall be applied evenly over the whole surface to give a solid film free from brush marks, sags, runs, orange peeling or other defects.

4.3.2.9. PLASTIC PAINTS

Surfaces to receive plastic paint shall rubbed down thoroughly and evenly with abrasive paper and filled as necessary. The filler shall be rubbed down and dusted off. Plastic paint shall be applied in on under coat and two finishing coats as approved by the project manager, with thinning and application time as recommended by the manufacturer.

Plastic paints shall be identified first for internal and external work and for matte and glossy finish.

4.3.2.10. SYNTHETIC ENAMEL PAINTS

Metal paints, after priming where necessary shall receive a minimum of two coats of synthetic enamel paint, or as approved by the Project manager. Thinning and application time shall be as recommended by the manufacturer.

4.4. CLEANING

Clean all areas affected by painting, by washing, paint removal of affected areas and polishing surface to ensure that no paint marks are left on the affected areas.

4.5. METHOD OF MEASUREMENT

4.5.1. GENERAL

- Painting on different surfaces shall each be given separately.
- Painting to internal and external surfaces shall be given separately.
- The following shall be understood as included.
    - o Trimming cutting, matching patterns, and the like.

- o Cleaning after decorating.
- o Priming and background application to paints and other decorations.
- o Working at any height and in different colors.
- o Protecting the work from damage by other trades.

4.5.2. MEASUREMENT

Painting, wall papers, plastic and fabric shall be measured by area.

Special application to edge shall be measured in length, by stating the girth of the surface exposed of painting.

Paints to metal surface shall be measured by area.

4.5.3. CLASSIFICATION

Painting and other decorative finishes shall be classified as follows:

- Walls, columns and beams.
- Ceiling which shall include soffits of beams.
- Slabs, staircases and in joinery.
- Staircases risers and treads.
- Skirting.
- Balustrades and rails
- Doors, windows, curtain walls and partition.
- Metal surfaces.

END OF SECTION

REFERENCE: LIST OF STANDARDS AND CODES

The various trades and materials to be applied shall be of a quality equal in all respects to the current edition at the time of tendering of the following Standards and Codes.

ES CD4 026	Hollow clay bricks, ESI
BS1232	Natural stone for building, BS
ES CD4 001	Solid clay bricks, ESI
ES CD3 301	Concrete hollow blocks, ESI
ES CD5 201	General requirements, Portland cement, ESI.
ES CD5 003	Hydrated lime, ESI
BS 1200	Sand for mortar for plain and reinforced brick work; brick walling & masonry, BS
ASTM C94	Mixing water for concrete
ASTM D-41.78	Built up roof concrete primer
ASTM D-2923.75	Built up roof heavy duty coating
ASTM D-2822.75	Built up roof patching compound
ASTM D-224.81	Built up roof membrane
ASTM D-2824.76	Built up roof aluminum roof coating
BS 743	Damp proof courses
ES C.D7.001	Galvanized plain sheets, ESI
ES C.D7.026	Galvanized corrugated sheets, ESI
ES G.B4.120	Steel wire nails, ESI
BS 2855	Corrugated aluminum sheet for general purposes
BS 1470	Wrought aluminum and aluminum alloys sheet and strip

BS 2465	Aluminum fixing accessories
BS 1490	Fixing accessories for building purposes

BS 402	Clay plain roofing tiles and fittings
ES.C.D1.101	Chip boards, ESI.
ES.C.D1,103	Ply wood, ESI.
BS 3444	Block Board & Laminboard
ES.G.B4.120	Nails, ESI
BS 1210	Wood screws
BS 1204	Synthetic resin adhesives
BS 6363	Welded cold formed steel structure hollow sections
BS 4360	Weldable structure steels
BS 5950	Structural use of steel in buildings
BS 639	Electrodes for manual metal arc welding
BS 4190	Black hexagonal bolts, screws and nuts
BS 4620	Metal arc welding of carbon and carbon manganese steels
BS 729	Hot dip galvanized coating on iron and steel articles
BS 1615	Anodic oxidation coating on aluminum
BS 3987	Anodic oxide coating on aluminum for external architectural application
BS 970	Wrought steel for mechanical & allied engineering purposes
ES C D5 201	General requirement, Portland Cement, ESI
ES C D5 003	Hydrated lime, ESI

BS 1198	Sand for internal plastering with gypsum plasters.
BS 1199	Sand for external rendering and internal plastering with lime and Portland cement.
BS 1369	Metal lathing for plastering
BS 3357	Glue size for decorators use
BS 2523	Lead based priming paints
BS 4652	Metallic Zinc rich priming paints
BS 245	Mineral solvent for paints
BS 4756	Ready mixed aluminum priming paints
BS 952	Glass for glazing

KOREA INTERNATIONAL COOPERATION AGENCY KOICA CAMEROON

The Scope of Works

DEMARCATION TABLE for SCOPE OF WORKS

Description		Works	Items	BOQ	DWG	Note
INTERIOR OFFICE BUILDOUT						
INTERNAL TOILETS	DIV 1	CIVIL Removal of existing plumbing equipment, demolition of floor and wall tiles, waterproofing, tiling and repainting.	Removal of existing plumbing and sanitary equipment, removal of existing Floor Tile, removal of existing Wall tiles and sanding of wall surface, casting of a new screed, waterproofing of floor and walls up to a height of 1.80 m in shower cabinets and 1.2 m in other toilet location, placing of floor tiles on waterproofed surface, placing of wall tiles on water proof surface to the door height, removal and replacement of damaged doors to include all locking mechanism and every necessary accessories, hack out existing paint, sand and repaint all non-tiled surfaces on wall and ceiling		DIVISION 0, DIVISION 1 DIVISION 13	1 cm thick porcelain tiles on 5cm thick screed for the floor treated and protected with waterproofing
		MECHANICAL Remove and replace all supply and drainage pipes for each toilet as shown on designs	Dismantling of existing wash basin, wc and all other sanitary equipment, remove all supply pipes through screed, replace all overhead drainage pipes as on plan, Redo all internal supply piping works for water supply through screed to include all necessary manifold boxes, piping to external supply, and piping from manifold to equipment using PER pipes or equivalent to all toilets to include all necessary accessories, pipe protection, testing and commissioning Replace worn out equipment: wcs, wash basin, showers, tissue paper holders, towel holders, grab bars, soap dispensers, mirrors to include all accessories.		DIVISION 1	
EXTERNAL STORM WATER	DIV 2	Remove and dispose existing gutter, reinforced concrete chambers, reinforced concrete gutters	Removal and disposal of existing gutter covers, Construction of special chambers for the down gutter from the Central Hospital, Clean existing gutter and redo the slope of existing gutter to allow quick drainage of water using concrete, Redo		DIVISION 2	

			all gutter covers to be jointly fitted with no gabs in between in order to completely isolate sewage water from the environment throughout the entire length of gutter, Create new gutter diversion in places indicated on plan, Place a pipe 200 Channel through septic tank linking gutters, Redo all underground piping of the grey and black water piping to septic tank, to include inspection chambers, as shown on the plans			
NEW WAITING AREA	DIV 3	Demolition of old waiting area, reconstruction and electrification of new waiting area close to the road.	Demolish existing waiting area and disposal of material to a location indicated by the CURY authorities, Excavation of foundation pits and foundation trenches, Blinding concrete, reinforce concrete footing and foundation pillars for the structure, Construction of a stone embankment wall as indicated on plan, Construction of foundation wall with CMU 20 mixed filled with grout, Reinforced concrete ground beams, All necessary anchorage of metallic structure on the concrete, Backfilling and compacting with successful layers of fill of 30 cm each, Underground sanding and concreting of ground slab, Supply and place metallic column tubes of size as indicated on plan, Elevation of wall with CMU 15 at the west end with windows as indicated on the plan, All necessary plastering, dressing, Construction of truss elements with details as indicated in the design, All necessary welding and anchorage of truss elements to existing structure, Supply and welding of roof sheet supports on the truss elements as indicated, Placing of the roof sheets; all necessary anchorage factored in, Supply and fitting of roof gutter with all necessary anchorage included, Rain water down pipes connected to compound drain, Reinforcement and concreting of coping for space between roof and wall, All necessary painting, antirust etc. on walls and metallic structure, Supply and install concrete screen wall in window openings on the elevated wall, Placing of floor tiles and skirting.		DIVISION 3 DIVISION 10	

EXTERNAL TOILET	DIV 4	Foundation, elevation, roof, mechanical and electrical works for External toilet	***Foundation*** Excavation of trenches, Blinding concrete, reinforce concrete for footing, columns and beams, Elevation of walls with CMU 20 filled with grout, Backfilling, Sand fill and concreting of ground slab ***Elevation*** Reinforced concrete for columns, and beams, Elevation of block wall with CMU 15 as shown on design, plastering of walls, Roofing with reinforced concrete ***Finishing*** Screed on the floor, Water proofing on floor and wall to a height of 1.80 m in shower cabinets and 1.20 m in other locations, Supply and placing of 30x30 floor tiles, Supply and placing of 25x40 wall tiles on toilet walls, Internal painting on all non-tile surface, External painting ***Mechanical*** Water supply to toilet manifold using PPR pipe, Water supply from manifold to equipment using PER pipes, Water drainage to include all necessary assemblies to biofil digester, Construction of a biofil digester ***Plumbing equipment*** Wc, wash basin, floor drains, soap dispensers, shower, mirror light, tissue paper holders, towel holders, etc. ***Electricity*** Supply and fitting of pipes and cables, Supply of switches and bulbs to include every accessory, Mirror lights etc.		DIVISION 4	
GENERATOR HOUSE	DIV 5	Replace existing roof with new roof trusses and roof sheets	Removal of existing roof sheet to dispose to a location designated by the hospital authorities, Removal of damaged roof truss to dispose to a location designated by the hospital authorities, placing of new roof truss to replace damaged roof truss, placing of new roof sheet to include every necessary fixing accessories, Roof gutter and every necessary		DIVISION 5	Roof sheet of 5 mm thick

			accessories			
INCINERATOR ROOM AND INCINERATOR	DIV 6	Redo present roof to a RC roof of 15 cm and waterproofing. Supply and place incinerator	Remove existing roof, Prepare and concrete solid slab on the existing incinerator house of thickness 15 cm, All necessary roof slopes, Install new incinerator with an exhaust pipe that goes through the concrete roof and continue to a height 4 m above generator house using a metal pipe of diameter adequate to suit the diameter of the waste exhaust pipe, Install at the end of pipe a necessary device to prevent rain water from seeping in, Hacking of existing walls, sanding and repainting, Water proofing on top of the roof slab, Redo floor tiles, Install new incinerator of 50kg/H		DIVISION 6 DIVISION 21	
WATER TANK	DIV 7	Add overhead slab on present tank, supply 3 tanks of 5000l, water and fire pumps	Excavation and demolition at the west end of tank where currently there is a drain pipe, concreting of a new rafter footing for pump house, Elevation of CMU 15 walls with door access opening for pump house and concreting of a slab wall on top of the pump house, concrete a well reinforced slab on existing water tank slab as shown on plans to carry water tank, Installation of three 5000l water tank on top of this slab to serve as domestic water supply tanks, All necessary piping connections to new tanks, Check and refurbish existing fire water tank to use for this purpose, Install fire booster pumps in newly constructed Pump house and connect to the fire hydrant system of Capacity: 6 Bar, Install domestic water supply booster pumps in newly constructed Pump house and connect to the domestic water supply system of Capacity: 3 Bar, Repair existing vacuum pumps to keep them as a manual stand by pump, All necessary electrical connections to the pump house		DIVISION 7	
MEDICAL GAS CHAMBER	DIV 8	Repairs	Repair broken vacuum pump (Replace Engine that is bad), Replace pipes from bottles to gas chamber and stop valves,		DIVISION 8	

			replace air filters, replace broken oxygen regulator			
INTERNAL PAINTING	DIV 9	Treat Water proofing problems, redo all painting	Hack out all damping areas on the walls and slabs, progress to treatment of surfaces and brocken wall edges, Apply a new layer of paint on all internal surfaces (walls, slabs and doors), Repainting of all hand rails		DIVISION 9	
ELECTRICITY	DIV 10	Replace fixtures	Replace all internal lighting fixtures to LEDS, Replace exterior Lamps, Replace lamps at the Generator House to LED 20x120, Create a new pannel board in sterilization room with description as shown on design using existing 3 Phase cable to this location, Replace damaged power outlets and switches		DIVISION 10	
AIR CONDITIONERS	DIV 11	Replace AC Units	Dismantle and stock all ACs that are required to be replaced as shown on the plans and stock in a defined location on site, Supply and install the following Split system Acs to include all necessary repairs for ducts present, Replace damaged switches.		DIVISION 11	
DOORS	DIV 12	Installation, replacement and repairs	Install, repair and replace existing damaged steel and wooden doors as indicated on the plan		DIVISION 12	
GENERAL TILE WORK	DIV 13	Redo tiles	Hack out and replace all damage floor tiles, tiles on counter top in nursing call room and skirting and floors indicated		DIVISION 13	

KOREA INTERNATIONAL COOPERATION AGENCY KOICA CAMEROON

STERILISATION ROOM	DIV 14	Redo window, treat damping problem, supply extractors	Build wall to close door between sterilization clean room and contaminated room, create another door at the west end close to the server room to access sterilization room as shown on plan, create a change area with another door to enter clean area, create a PVC Stripe falls wall to protect damping around the server room wall, Create a counter top of 1.0x1.0x1.0 with openings on both site between sterilization clean room and contaminated room, operation rooms and external corridor. Counter shall be done with aluminum profiles and double glass of 3x3 with a fine film between the glass. Openings shall be created on both sites with a connection mechanism that allow only one site to be open per time. The counter shall be of concrete of 8 cm thick with a 1x1 tiles placed on top without any joint, install extractor fans to extract any contaminated air from sterilization room, Re-cable room to meet up with demands of the room		DIVISION 14	
PATIENT ROOM AND COURTYARD	DIV 15	Treat damping problem, supply extractors	Create PVC Strip wall cladding to solve damp proofing problems and paint to match color of room, Install Individual curtain, install exhaust fan extractors as shown in plans in the noted rooms, Supply and cable electricity to all these rooms, Install VAV system fresh air into the operation rooms as shown on the plans, Cable new lines to connect new fan installations		DIVISION 15	
LAUNDRY ROOM	DIV 16	Install Equipment	Supply and install a new 100 kg laundry machine as per technical SPECS, Supply and install a new electrical drier of capacity 100 kg. See technical SPECS		DIVISION 16, 21	
RESUSCITATION	DIV 17		Excavation and placing of a new pipe of 125 as shown on plans to include all necessary works of retiling of the zone excavated, Change floor drain floor drain to allow a strainer of at least 125 diameter		DIVISION 17	
OPERATION LAMPS	DIV 18	Replace lamps only	Replace blown lamps only with 3 Cartons of lamps		DIVISION 18	

FIRE DETECTION	DIV 19		See BOQ		DIVISION 19, 20	
TELECOMMUNICATION AND SPEAKER	DIV 20		Change all defective broadcasting speaker system, Change defective interphone, Wire to loop broadcasting system to fire system for automatic call		DIVISION 19, 20	
EQUIPMENT REPAIRS	DIV 21		See BOQ		DIVISION 21	
EXTERNAL LAUNDRY	DIV 22		Demolish external laundry at the space for the construction of Waiting Area, Construct new external laundry according to designs between the external toilet wall and the gas station wall.		DIVISION 22	

Contract for International Construction Works

This Contract for International Construction Works (this "Contract") is made on the ____ day of _____ 20XX (the "Effective Date")

BETWEEN

(1) The _____ local office of the **Korea International Cooperation Agency** ("KOICA"), a governmental organization established under the laws of the Republic of Korea ("Korea") and having its registered address at 825, Daewangpangyo-ro, Sujeong-gu, Seongnam-si, Gyeonggi-do, Republic of Korea (13449) (the "**Employer**"); and

(2) [*insert name*], a [*insert type of company i.e. limited liability*] company incorporated under the laws of [*insert jurisdiction*] and having its registered address at [*insert full address*] (the "**Contractor**").

A. CONTRACTOR'S COVENANT

In connection with the [*insert name/description of the project/development*] (the "**Project**") which KOICA is in the process of implementing in [*insert name of country in which the Project is being implemented*] (the "**Recipient Country**") and the related construction and construction works covered under [*insert name of contract*] (under Contract No. _____) (the "**Construction**" or the "**Construction Works**"), the Contractor hereby (i) represents and warrants to the Employer and KOICA that it possesses the requisite experience, expertise, qualifications and capabilities; (ii) agrees that all terms and conditions and ancillary or supplementary documents provided in connection with this Contract form part of this Contract; and (iii) covenants to fulfill its obligations under this Contract in good faith.

B. KEY TERMS AND CONDITIONS

The key terms and conditions of this Contract are as follows:

1. Contract Price: _____ (_____) (inclusive of VAT and other taxes)
2. Deposit: _____ (Type: _____)
3. Completion Deadline: _____
4. Rate of Liquidated Damages for Delay: [*0.05*% of the Contract Price] / day
5. Rate of Security Deposit for Defects: [3]% of the Contract Price
6. Contract Documents:
   - 6.1 this Contract
   - 6.2 General Conditions of the Contract for International Construction Works (the "**General Conditions**")
   - 6.3 Special Conditions of the Contract for International Construction Works (including the Detailed Terms and Conditions, Schedules, Appendices, Annexes and Attachments) (the "**Special Conditions**")
   - 6.4 Design Documents
   - 6.5 Statements of calculation, proposal, instruction to bidders regarding the tender for international construction works and other tender documents, as well as other document that form part of this Contract (including without limitation notices and communications exchanged between the parties hereto in accordance with the terms of this Contract)

C. COUNTERPART EXECUTION

This Contract may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties hereto have caused this Contract to be duly executed and delivered by their duly authorised signatories as of the date first written above.

For the EMPLOYER	For the CONTRACTOR
_____ Local Office of Korea International Cooperation Agency	[*insert full name*]
_____	_____
Name: Title: [Contracting Manager] Address:	Name: Title: [Representative Director / CEO] Address:

Section 05.

Employer's Requirements

1. Engineer and his Representative

1) **The Engineer (Construction Management as Representative of Employer)** may exercise the authority specified in or necessarily to be implied from the Contract, provided, however, that the ENGINEER shall obtain the specific approval of the Employer before taking any of the following actions:

   1. approving assignment of any part of the Works;
   2. certifying additional cost determined;
   3. determining any extension of time;
   4. issuing Change Order;
   5. issuing orders for the suspension of works;

   The ENGINEER has the power to issue instructions related to the control of quality and quantity at any time and to remove from the site any rejected materials.

   The ENGINEER has the power to reject unreasonable claims submitted by the Contractor.

   Any extra quantities implemented by the Contractor or the Contractor's employee at his own responsibilities and not included in the drawings, the ENGINEER has the authority to reject and cancel these quantities from the Contractor's payments without any claim by the Contractor.

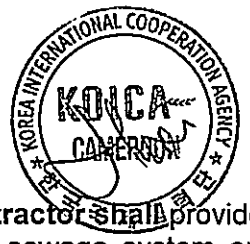
2) **Engineer's Office (Temporary Site Office)**

   The Contractor shall provide a temporary office, furniture, supplies (including drinking water supply, electricity, sewage, air-conditioner, stationary, internet line, safety shoes and etc.), and other facilities for the ENGINEER and his supervision staff. The Contractor should also provide the services needed for their operation and maintenance throughout the execution of the project.

   However, this office is to be removed from the site after the completion of works. This Site office should be taken out of the site after completing the construction unless the Employer agree to maintain it for his needs upon contractor's request. The office shall consist of the 16 square meters (m2) spaces as a minimum. Each space shall be separated with partitions up to the ceiling.

3) **The Contractor shall**, at his own expenses, and within thirty (30) days from the Effective date, provide the temporary Site office with adequate furniture and equipment comprising.

4) **The Contractor shall** provide the temporary office building and provide all the required furniture and supplies within thirty (30) days from the date of issuing the Order to Commence. If the Contractor fails to complete and furnish the office building within the specified period of time then the Employer will provide the office building and furnish it on the Contractor's expense whatever it costs, plus 25 % of whatever it costs as managerial costs.



5) **The Contractor shall** provide the Site Facilities at his own expense with pure water, complete sewage system environmentally acceptable and electricity. Where main electrical supplies are not available on Site, he shall provide a generator with suitable capacity, and water tanks of suitable sizes including the required petrol, diesel or gas for operation of the site offices.

6) **Measuring and Inspection Devices**
The Contractor shall, at his own expense provide all necessary measuring and inspection devices such as tapes in different lengths, leveller and other surveying instruments requested by the ENGINEER and moulds for concrete and slump tests. These devices shall be available on-site throughout the execution of the Contract and shall be under the control of the ENGINEER.

7) **Telecommunication Means**
The Contractor shall, at his own expense provide and operate for ENGINEER's use the internet service. The Contractor shall pay the bills (excluding international calls) and other costs pertaining to this throughout the Contract Period.

8) **Project Signs**
The Contractor shall at his own expense install minimum three (3) project signs at the site during construction, which shows the name of the Project, the Employer, and the donor, which will be referred to, as in the following text the ENGINEER, and the Contractor. Materials, size (2m x 3m), text and shape shall be to the approval of the ENGINEER.

9) **Temporary Fence and Safety Boundary Walls**
The Contractor shall at his own expense protect the boundaries of the site, if necessary, by installing a temporary wall made of 2 m high metal sheets fixed on a wooden structure. A main gate for the site is to be installed.

This fence should be periodically maintained by the Contractor. The Contractor shall save harmless and indemnify the Employer in respect of all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of, or in relation to, any accident resulting from improper installation of this safety fence.

10) **Access to the Site**
The Contractor shall at his own expenses have a permit and its process to access to the site from the related authority at all time, as required.

11) **Failure of the Contractor to Comply**
If the Contractor fails to provide any of the above-mentioned items, then the Employer will provide at the expense of the Contractor and the cost will be deducted from payments due to the Contractor whatever reaches, plus 25 % of whatever it costs as managerial costs.

The Contractor is deemed to have allowed for all the above expenses in his Tender Price.

2. Materials, Samples and Tests

All construction materials shall be compared of the price of local made and imported material as a first priority because this project has the agreement of tax exemption. Second priority for European made if it is not available in the local market. All materials shall conform to the Technical Specifications.

The Contractor shall submit the samples for all the material to be used in the execution of the Works within two months from the date of the Order to Commence and within one month before the use of such material in the construction works.

If and when the Contractor proposes an alternative material suitable for its required use, then he shall notify the ENGINEER in writing of its specifications, before its import, for prior approval.

The Contractor shall within two (2) month from the date of the **Order to Commence** provide the Employer with **submittal List** regarding materials which need approval by the Engineer – including shop drawing, samples, catalogues, certificates of origin and testing and approval certificates:

<sample of Material Delivery Schedule>

Item	Date	Approval	Order	Factory Manufacture	Delivery	Custom Clearance	Arrival on Site	Installation	Testing	Inspection
Steel Structure	P: A:									
Generator	P: A:									
UPS	P: A:									
Elec. Boards	P: A:									
Transformer	P: A:									
ATS	P: A:									
CCTV	P: A:									
Audio Equip.	P: A:									
Fire Fighting	P: A:									
Nursing Call	P: A:									
Data Rack	P: A:									
Air Conditioner	P: A:									
Water Tank	P: A:									
Pump	P: A:									
Sanitary fixture	P: A:									

The Contractor shall submit the **Inspection & Test Plan** within two (2) months since **Order to Commence.**

The ENGINEER has the right to conduct any test, either on the samples or on the delivered materials. The cost of these tests shall be paid by the Contractor.

The ENGINEER will approve an authorized laboratory-testing firm by the International Standards. All samples shall be taken on site by the laboratory staff.

Laboratory firm shall submit a report contains studies and analysis and evaluation of results and the consequent recommendations in accordance with present specifications.

3. Ownership of Plant and Materials

1. All contractor's Equipment, Temporary Works Plant and materials owned by the Contractor or by any company in which the Contractor has a controlling interest, shall when present on the Site, be deemed to be the property of the Employer.

2. If the Contractor fails to remove equipment, plant, materials or Temporary Works from the Site within a reasonable period after the Completion of the Works or Termination of Contract, in accordance with the instructions of the ENGINEER, then the Employer may remove either by sale or returning them to their original owners, If hired , at the expense of the contractor, then the settlement of account shall be made with the Contractor, and if any amount is due to him, he shall be paid such sum. However, if the result of such settlement did not cover the cost of removal, then such amounts shall be deducted from payments due to the Contractor.

4. Construction Schedule

The Contractor shall take into consideration the ENGINEER's comments, and amend his schedule to a suitable technical standard. The amended Schedule shall be submitted within (7) days from the date of receipt of the ENGINEER's comments.

The Contractor shall submit to the ENGINEER, for his approval, an updated schedule at the end of each calendar month. If the Contractor does not submit an updated schedule, the ENGINEER may retain the Contractor's payment due for that month till the updated schedule has been submitted and approved.

5. Supply from Employer to Contractor

The Employer shall supply to the Contractor the forms, models and guidelines identifying the required attachments to be submitted by the Contractor with the drawings and documents for approval.

Instructions given by the ENGINEER shall be in writing, provided that if for any reason the ENGINEER considers it necessary to give any such instruction orally, the Contractor shall comply with such instruction. Confirmation in writing of such oral instruction given by the ENGINEER, whether before or after the carrying out of the instruction, shall be deemed to be an instruction within the meaning of this Sub-Clause. Provided further that the Contractor, within 7 days confirms in writing to the ENGINEER any oral instruction of the ENGINEER and such confirmation is not contradicted in writing within 7 days by the ENGINEER, it shall be deemed to be an instruction of the ENGINEER.

6. Assistance with Local Regulations

The Employer will not provide any services or assistance to the Contractor in obtaining copies of laws, regulations and information on local customs, orders or by-laws of the country where the works are located which may affect the Contractor in the execution of his obligations under the contract and they are included within the responsibilities of the Contractor.

7. Contractor's Drawings

The Contractor shall submit to the ENGINEER for his approval shop drawings showing the methods and details to be used in the execution of all items of the works.

Within (10) days after commencement the work, the Contract should prepare and submit to the ENGINEER the grid topography map of the site existing levels (natural ground levels) for the ENGINEER's review and recheck directly in site before commencing any mobilization in order to be signed and documented.

8. Interference with Traffic

All operations necessary for the execution and completion of the Works and the remedying of any defects therein shall, so far as compliance with the requirements of the Contract permits, be carried on so as not to interfere unnecessarily or improperly with:

(a) The convenience of the public, or
(b) The access to, use and occupation of public or private roads and footpaths to or of properties whether in the possession of the Employer or of any other person.

The Contractor shall save harmless and indemnify the Employer in respect of all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of, or in relation to, any such matters insofar as the Contractor is responsible therefore.

9. Demolished Materials

1. All materials and articles shall be the property of the Employer.
2. The Contractor shall at his expense, remove all rubble and other demolition materials and debris from site and to authorized places and upon the previous permission of the Employer. If these materials are required by KOICA or local authorities it must be handled to them properly with complete cooperation.
3. Agricultural materials that may result from the project shall be the property of the Employer; in case that the Employer does not require these materials or part of, the Contractor shall remove this material from the site at his expense.

10. Discoveries

The Contractor shall not be compensated for any special efforts during excavations carried out on land belonging to the Employer or local authorities.

~~11. Soil Studies~~

~~The Contractor shall recheck the accuracy of the soil investigation report prepared by the designer and shall, at the completion of the foundation excavation call upon the soil investigation laboratory to check the compliance of the foundation strata with the outcomes of his soil testing. If any discrepancy appeared as due then he shall obtain the local authority or the ENGINEER's approval for any recommendation of Laboratory Testing firm. All the consequent cost of that shall be at the Contractor own expenses~~

~~Examination and photographing of soil and work before covering up are obligatory and should be approved by the ENGINEER.~~

12. Quality of Works and Materials

Every notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the ENGINEER's notice.

If the Contractor has not corrected a Defect within the time specified in the ENGINEER's notice, the ENGINEER will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

The materials used in the works should be in accordance with the specifications of the contract. Appropriate deduction will be applied for bad performance or materials quality.

13. Inspection and Testing by the ENGINEER

If any test is ordered by the ENGINEER which is
a) not so intended or provided for, or
b) (in the cases above mentioned) not so particularized, or
c) (though so intended or provided for) required by the ENGINEER to be carried out at any place other than the site or the place of Manufacture, fabrication or preparation of the materials or Plant tested.

And the results show the materials, Plant or workmanship not to be in accordance with the provisions of the contract or to the satisfaction of the Employer, and then the cost of such

test shall be borne by the Contractor.

14. Interim Payments

- Application for interim payment, final payment or any other payment shall, as a minimum include the following documents:

- Payments are made every 60 days based on the progress rate

1- Payment request signed by the Contractor: Interim Payment Certificate or Final Payment Certificate form (the form is to be provided by the Employer)
2- Payment Summary Form which shows all items of work of the BOQ performed and requested for payment under this application and those previously paid and their quantities (format to be provided by the Employer).
3- Measurement sheets for all items of work previously paid and those requested to be paid under this application.
4- Test Certificates of all materials, components and workmanship incorporated in the performance of the items requested for payment.
5- The progress photos
6- Monthly Report in accordance with the guidelines of the Employer.
7- The Contractor shall also submit an electronic copy to the ENGINEER.
8- Not applicable
9- The approval of the ENGINEER and proceed the payments do not relieve the Contractor from any of his responsibilities or obligations.
10- Valid insurance as per General Conditions and Special Conditions of Contract.

15. Taking-Over

The Contractor shall, within one month from the date of issuing the Taking-Over Certificate, submit the following:

1- Three copies of all operation and maintenance (O&M) manuals and instructions for operation of any equipment or mechanical and electrical apparatus, in English/Local language text.
2- Four copies of the As-Built Drawings (including the original copy) in addition to soft copy saved on a UBS hard disk of 500GB or more capacity.
3- Four copies of the Final payment including all measurement sheets and the final BOQ. This should also be saved on the UBS hard disk.
4- List of spare parts for each equipment or apparatus, other than those spare parts that he is required to supply in accordance with the Contract, these parts which are supposed to have been supplied by the Contractor prior to the issue of the Provisional Acceptance Certificate.
5- Final Report showing all works activities and details for all stages, using a set of photographs that shall be signed by the Contractor and approved by the ENGINEER.
6- If the Contractor fails in fulfilling all or any of the above mentioned, then the ENGINEER or the Employer will deduct the missing value on the account of the Contractor.

16. Insurances

For clarification only, the following are the insurances required for the Project:

(a) Insurance of the Permanent and Temporary Works to include materials and Plant to values specified in the Contract.
(b) Insurance of the Equipment.
(c) Third Party Insurance - property and persons.

(d) Insurance against accident or injury to workmen and employees.

Use of Insurance Compensation

"In case of any damage to the Works or any part thereof or to materials or Plant or Temporary Works due to risks covered by the insurance, the Contractor shall, as rapidly as possible, carry out the repairs and making good of the defects. The insurance company shall pay the insurance compensation to the Employer who will in turn pay any amount he receives to the Contractor in installments in accordance with the ENGINEER's recommendations. If the value of the compensation is greater than the amounts to be paid to the Contractor, then these amounts shall be paid to the Contractor, and if it is less than the cost of repair, then the Contractor shall bear the difference"

Accident or Injury to Workmen

"*The Contractor shall immediately notify the ENGINEER in writing about any accident which occurs on Site if it results of an injury to any of the labourers or employees or damage to property, and he shall provide him with the details and the affidavits of witnesses. Also, the Contractor shall inform the concerned authorities about such accidents when and if the laws and regulations so require*".

17. Work Procedure & Program

The Contractor shall submit Work Procedure & Program including the below items within **one month (30 days)** since signing the Contract Agreement and get approval from Engineer.

(a) Construction Overall Schedule and Construction Management Plan
(b) Organization Chart and Role & Responsibility of Site Staffs.
Resume and copy of qualification to be included.
(c) Sub-contractor list for Civil, Architectural, Structural, Mechanical, Electrical work
(d) Equipment and Machine Schedule including documents certificating 'owned' or 'hired'.
(e) HSE (Health, Security and Environmental) plan and HSE manager information and allotting plan.
(f) Mobilization Plan including Engineer's Office
(g) Quality Assurance and Control Plan
(h) The List of imported materials and estimated Price (Tax exemption) and material delivery plan
(i) The review of drawings and BOQ, which is resource of design change-order.

18. Reports

18.1 Daily Reports:

• Prepare a daily construction report recording the following information concerning events at project site.

a) List of subcontractors at project site.
b) Number of man power at project site.
c) Equipment at project site.
d) Material deliveries.
e) High and low temperatures and general weather conditions.
f) Accidents.
g) Meetings and significant decisions.
h) List of documents that report to the Employer or the Engineer
i) Unusual events (refer to "Special Reports" below).

18.2 Weekly Reports:

• Prepare a weekly construction report recording the following information concerning

events at project site.

a) List of subcontractors at project site.
b) Approximate count of personnel at project site.
c) Equipment at project site.
d) Material deliveries.
e) High and low temperatures and general weather conditions.
f) Accidents.
g) Meetings and significant decisions.
h) Unusual events (refer to "Special Reports" below).
i) Stoppages, delays, shortages, and losses.
j) Emergency procedures.
k) Orders and requests of authorities having jurisdiction.
l) Change Orders received and implemented.
m) Work Change Directives received and implemented.
n) Services connected and disconnected.
o) Substantial completions authorized.

18.3 Monthly Reports:

• Monthly construction report shall summarize major activities described in the daily and weekly reports.

• Minimum of 12 digital images shall be taken and included to document the progress of construction each month with the following manner.

a) The photo shall have the same views from the same locations. Include photos of following when they apply to this work
b) Outside of the building
- View of the main building entry.
- Overall view of the building from the entry drive.
c) Include other selected vantage points to best show status of construction and progress since last photographs were taken.
d) Take exterior construction progress photos in daylight, at a time of day when the featured building elements are not in extreme shadow, and generally the same time of day as the photos taken the previous weeks.
e) Use highest point in the site to get overall view photographs of the project once a month. Get at least one view from each direction, including each of the four building faces, along with the entire site and entry from main access road.

18.4 Final Report:

• Final report shall be included below.

a) Construction overview: summary, design change, contract change, etc.
b) As-built drawings
c) Photos: from commence date to completion
d) Check list: preliminary and final inspection
e) Laboratory records
f) Actual schedule and final BOQ
g) Operation and Maintenance manual
h) Training program (signed)(if any)

18.5. Design Change Reports:

• General

Any design changes from the original design documents that may result in a significant increase or decrease in the contract price shall be handled according to the Contract.

• The Contractor shall submit the design change report through the Supervisor and shall be required approval of the Employer.

• Design change report shall be included below

a) requested by whom
b) the reason for the design change
c) the location
d) before and after drawings
e) BOQ.

• Design change list including minor changes shall be included in the payment request as an attachment. A minor change means a slight change in the installation of materials or construction technology or a slight increase or decrease of quantities that can be performed within the Construction Price.

18.6. Special Reports:

• General

Submit special reports directly to Employer within One (1) day of an occurrence. Distribute copies of report to parties affected by the occurrence.

• Reporting Unusual Events

When an event of an unusual and significant nature occurs at project site, whether or not related directly to the work, prepare and submit a special report. List chain of events, persons parting, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

• Reports shall be made at the request of the Employer.

19. Tax Exemption and Refund

Any taxes including VAT (value added taxes) incurred in the course of the Bidding or Contract between Employer and Contractor shall not be subject to either Employer's right or responsibility. Therefore, the tax collection or refund related to the Works in Contract shall be subject to the governmental institute or agency or organization according to relevant laws and acts, and formal Record of Discussion between KOICA and the related authorities.

- End -

Special Conditions of the Contract for International Construction Works

These Special Conditions of the Contract for International Construction Works (the "**Special Conditions**") modify and/or supplement the General Conditions depending on the individual Project and Construction and depending on the individual Project and Construction, may be negotiated with the bidder at the time of advanced disclosure or when a bidder is selected as a preferred bidder.

Article 1 – Modified Terms and Conditions

The following terms and conditions of the General Conditions shall be modified as set out below. To the extent a term or condition of the General Conditions is not mentioned below, such term or condition shall apply without any modification, amendment or adjustment.

Article	General Condition subject to Modification

Article 2 – Supplementation of Terms and Conditions

The following terms and conditions shall supplement the terms and conditions in the General Conditions. To the extent a term or condition of the General Conditions is not mentioned below, such term or condition shall apply without any supplementation, amendment or adjustment.

Article	General Condition subject to Supplementation
7.1	If the Laws of the Recipient Country require that the commencement of construction be reported, the Notice of Commencement shall be submitted to the relevant Governmental Authority having jurisdiction under the applicable Laws of the Recipient Country by the applicable deadline as prescribed for in the Detailed Terms and Conditions.

[Annex 1]

Detailed Terms and Conditions

Construction Site Manager	Name, Title, Contact Details, Other Information	
Defect Notification Period		
Construction Supervisor	Name, Title, Contact Details, Other Information	
Contract Price		
Bid Rate	_____ %	
Latent Defects	If not applicable, the special provisions regarding latent defects shall not apply and any liability relating to defects shall be determined in accordance with applicable Laws.	
Project Name		
Date of Commencement	YYYY / MM / DD	
Completion Deadline	**For the whole Construction :** YYYY / MM / DD **For a part of the Construction:** YYYY / MM / DD	
Notice Details	**Employer** Copy to: Title Fax no. Phone no. e-mail	**Contractor** Copy to: Title Fax no. Phone no. e-mail
Date of Site Delivery	YYYY / MM / DD If Site Delivery is in stages:	

Performance Guarantee Amount	__% of the Contract Price Any additional amount to be provided pursuant to Article 4.2(b) of the Contract shall be ___% of the increased Contract Price
Working Hours	The actual working hours of the Contractor's workforce
Liquidated Damages	Whole Construction: KRW_____ / day (or ----% of the Contract Price) In the case of partial completion, consider whether to impose liquidated damages for delay in respect of each milestone and if so, how much
Cap on Liquidated Damages	___% of the Contract Price
Indirect Expenses and Profits of Reserve Funds	Generally, ___% of the relevant amount If no reserve funds, state as "N/A"
Upper Limit and Deduction Ratio on Reserves	Generally, ___% of the relevant amount If no reserves, state as "N/A"
Security Deposit for Defects	___% of the Contract Price May be exempted if reserves are available
Currency of Contract and Payment	
Default Interest on Outstanding Applicable Payments (Article 12.4)	_____ % per annum
Cap on Liability	The larger of (a) the total amount of insurance coverage purchased by both Parties and (b) the Contract Price
Employer's Insurance	

Contractor's Insurance	1. Contractor's All Risk Insurance: insurance covering loss and damage to the Construction itself and equipment 2. Third Party Liability Insurance: insurance covering personal injury or property damage to third parties arising in connection with or as a result of the Construction Works 3. Workmen's Compensation Insurance: insurance covering personal injury to the Contractor's workforce arising in connection with or as a result of the Construction Works 4. Marine Cargo Insurance 5. Contractor's Plant and Equipment Insurance including plant and equipment required for operational activities and temporary buildings 6. Motor/Vehicle Insurance 7. Professional Indemnity Insurance
Governing Law	
Dispute Resolution	
Documents to be submitted by the Contractor	(When applying for the issuance of a taking over certificate for completion of the Construction) 1. Photos (10"x15") of the front, back and sides of the completed Construction and the original photo files 2. Five (5) copies of the videos (CDs, or other device) showing the Completion Inspection process 3. Completion documents and report which describe in detail the whole construction process (including administrative processes, participation of technicians and other participants) from commencement to completion

[Annex 2]

Status of Construction Site

[Describe the Project, the location and area of the Construction Site that will be accessible pursuant to Article2.1 of the Contract and provide details of relevant boundaries, restrictions or regulations and site facilities to be provided by the Employer.

For example, include (i) a general description of the Site location, its boundaries, the status and purpose of the areas to which access has been granted to the Contractor; (ii) details of access roads that may be used either exclusively or with other users, the date from which they may be accessed, any restrictions on use (i.e. regarding access to a part of the Site or in relation to works (such as stacking or other ground improvement works) completed by other contractors); (iii) information about the surrounding environment of which the Contractor should be aware; (iv) a description of facilities that may be used by the Contractor and the location thereof, and details of costs (such as electricity bills, etc.) and who is responsible for such costs; and (v) such other relevant information.]

[Annex 3]

Construction Specification

[Insert details of the standards of construction (including general and special specifications) with which the Contractor must comply and the roles and responsibilities of each of the Contractor and the Employer. The following may be considered and included:

(a) General description of the Project and Project background

(b) Description of the Construction and Construction Works

(c) The Employer's intentions for the Project and the objective of the Construction Works

(d) The standards for determining whether the Employer's intentions have been accomplished and satisfied

(e) Design drawings showing the scope of the Construction and Construction Works

(f) Provision of a manual regarding materials and equipment and the Contractor's obligations in respect thereof

(g) Standards for Contract performance

(h) Technical standards with which the Contractor must comply

(i) Requirements of testing, commissioning and inspections

(j) Requirements for quality management

(k) Environmental standards with which the Contractor must comply

(l) LEED standards with which the Contractor must comply

(m) Safety and health standards with which the Contractor must comply

(n) Other applicable Laws with which the Contractor must comply

(o) Other Employer rules, regulations and policies with which the Contractor must comply

(p) Noise and traffic Laws with which the Contractor must comply

(q) Noise pollution and vibration Laws with which the Contractor must comply

(r) Contractor Documents (including completion documents, manuals, technical documents, reports) which the Contractor must provide

(s) Governmental Authorizations which the Employer must obtain

(t) Governmental Authorizations which the Contractor must obtain

(u) Facilities, equipment and materials to be provided by the Employer

(v) The Contractor's services in respect of existing facilities

(w) Training to be provided by the Contractor to the Employer

The original meanings of abbreviations should be set out in full; be careful not to include documents that are not related to the Project. If too much information is included in this Annex, it may be difficult to interpret the Contract uniformly, so the name, table of contents, order, date, etc. of the documents to be attached to the Construction Specifications should be set out clearly. See below for an example.

1. Document title: "Part A: General Specification (Bridges)", Author: "XX Consultants", Date: October 2007, Revision Number: 1;
2. Document title: "Part B: General Specification (Roads, Infrastructure and Services)", Author: "XX Consultants", Date: September 2007, Revision Number: T1;
3. Document title: "Part C: General Specification (Marine)", Author: "XX Consultants", Date: September 2007, Revision Number: T1;
4. Document title: "Part D: Particular Specification, Author: "XX Consultants", Date: September 2007, Revision Number: T1

The documents attached to this Annex must be consistent with the General Conditions and the Special Conditions.]

[Annex 4]

Design Drawing

[This Annex should include a list of all of the Design Documents that form the basis of the Contract. Details of the documents, such as name, reference number, modification number, date of creation, etc., should be clearly listed and set out.]

[Annex 5]

Forms of Guarantees

(A) Form of Bank Guarantee for Performance
(B) Form of Bank Guarantee for Advance Payment
(C) Form of Parent Company Guarantee
(D) Form of Legal Opinion

BANK GUARANTEE FOR PERFORMANCE

[*Name of Bank*]

Date: [*Date of Issuance*]

To: [*KOICA*]

Dear [*KOICA*]

[*Name of Contract*] Construction Contract - Bank Guarantee for Performance

You entered into a contract dated [*Insert date of Contract*] with [*Insert name of Contractor*] ("Contractor") titled [*Insert Name of Contract*] Construction Contract for the [*Insert name of Project*] for certain works and services ("Works") to be undertaken by the Contractor ("Contract").

We, [*Insert full name of Bank*], irrevocably and unconditionally undertake with you that whenever you give written notice to us stating that in your sole and absolute judgment the Contractor has failed to observe or perform any of the terms, conditions or provisions of the Contract on its part to be observed or performed, we will, notwithstanding any objection which may be made by the Contractor and without any right of set-off or counterclaim, immediately pay to you or as you may direct such an amount as you may in such notice require not exceeding the sum equivalent to [*Insert percentage*]% of the Contract Price ("Guaranteed Sum").

This Bank Guarantee for Performance ("Guarantee") is valid and will continue to be valid from the date of this letter for the Guaranteed Sum and will reduce to [*Insert rate of defect liability warrant rate*]% of the Contract Price upon the issue of the final taking over certificate. This Guarantee will automatically become null and void on the issue of the final completion certificate or, if a dispute arises under the Contract, after the final determination of that dispute, whichever occurs later.

Any payment by us in accordance with this Guarantee must be in immediately available and freely transferable [*currency (KRW or USD)*] free and clear of and without any deduction for or on account of any present or future taxes, levies, imposts, duties, charges, fees, set off, counterclaims, deductions or withholdings of any nature whatsoever and by whomever imposed.

Our obligations under this Guarantee constitute direct primary, irrevocable and unconditional obligations, do not require any previous notice to or claim against the Contractor and will not be discharged or otherwise prejudiced or adversely affected by any:

- time, lenience or tolerance which you may grant to the Contractor;
- amendment, modification or extension which may be made to the Contract or the Construction Works executed under the Contract;

- intermediate payment or other fulfilment made by us;
- change in the constitution or organization of the Contractor; or
- other matter or thing which in the absence of this provision would or might have that effect, except a discharge or amendment expressly made or agreed to by you in writing.

This Guarantee may not be assigned by you to any person, firm or company other than an Affiliate, without our prior written consent, which must not be unreasonably withheld. You must notify us in writing of any assignment, after which we must make any payment claimed under this Guarantee to the person, firm or company specified in the notice which will constitute a full and valid release by us in relation to that payment.

Any notice required by this Guarantee is deemed to be given when delivered (in the case of personal delivery) or forty-eight (48) hours after being despatched by prepaid registered post or recorded delivery (in the case of letter) or as otherwise advised by and between the parties.

We agree that part of the Contract may be amended, renewed, extended, modified, compromised, released or discharged by mutual agreement between you and the Contractor, and this security may be exchanged or surrendered without in any way impairing or affecting our abilities under this Guarantee without notice to us and without the necessity of any additional endorsement, consent or guarantee by us, provided, however, that the Guaranteed Sum does not increase or decrease.

No action, event or condition which by any applicable law may operate to free us from liability under this Guarantee will have any effect. We waive any right we may have to apply such law so that in all respects our liability under this Guarantee will be irrevocable and, except as stated in this Guarantee, unconditional in all respects.

Capitalized words and phrases used within this Guarantee have the same meanings as are given to them in the Contract.

This Guarantee is governed by the Uniform Rules for Demand Guarantees, ICC Publication No. 758, provided that the supporting statement under Article 15 (a), and Articles 34 and 35 are excluded. Any disputes arising out or in connection with this Guarantee, or the breach, termination, or invalidity thereof will be referred to and finally resolved by arbitration in accordance with the UNCITRAL Arbitration Rules then in effect, the language of the proceedings being English.

Nothing in or relating to this Guarantee shall be deemed a waiver, express or implied, of any of the privileges and immunities of [*KOICA*], which are hereby expressly reserved.

IN WITNESS of which the [*Insert full name of Bank*] has duly executed this Guarantee on the date stated above.

SIGNED by [*insert*])
as attorney for [*insert*]) under power of attorney dated) [*insert*])
in the presence of)
)
.....) Signature of witness)
)
.....) Name of witness (block letters))
)
.....) Address of witness)
)
.....) Occupation of witness

..... By executing this agreement the attorney states that the attorney has received no notice of revocation of the power of attorney

Address for notices

[*insert address*]

BANK GUARANTEE FOR ADVANCE PAYMENT

[*Name of Bank*]

Date: [*Date of Issuance*]

To: [*KOICA*]

Dear [*KOICA*]

[*Name of Contract*] Construction Contract – Bank Guarantee for Advance Payment

You entered into a contract dated [*Insert date of Contract*] with [*Insert name of Contractor*] ("Contractor") titled [*Insert Name of Contract*] Construction Contract for the [*Insert name of Project*] for certain works and services ("Works") to be undertaken by the Contractor ("Contract").

In consideration of your paying the sum of [*Insert amount*] as an advance payment to the Contractor under the Contract ("Advance Payment") we, [*Insert full name of Bank*], irrevocably and unconditionally undertake with you that whenever you give written notice to us stating that in your sole and absolute judgment the Contractor has failed to observe or perform any of the terms, conditions or provisions of the Contract on its part to be observed or performed, we will, notwithstanding any objection which may be made by the Contractor and without any right of set-off or counterclaim, immediately pay to you or as you may direct such an amount as you may in such notice require not exceeding [*Insert amount*] ("Guaranteed Sum").

This Bank Guarantee for advance payment ("Guarantee") is valid and will continue to be valid from the date of this letter for the Guaranteed Sum. For each of the interim payments after the advance payment is made, that are made by you to the Contractor, the proportion of the Guaranteed Sum that is payable to you will be reduced by [*Insert rate of deduction*].

This Guarantee will automatically become null and void upon us receiving from you certification that the Guaranteed Sum has been fully repaid by the Contractor.

Any payment by us to you in accordance with this Guarantee must be in immediately available and freely transferable [*Insert currency*] free and clear of and without any deduction for or on account of any present or future taxes, levies, imposts, duties, charges, fees, set off, counterclaims, deductions or withholdings of any nature whatsoever and by whomever imposed.

Our obligations under this Guarantee constitute direct primary, irrevocable and unconditional obligations. Additionally, our obligations do not require any previous notice to be given to the Contractor and do not require that any claim be made

against the Contractor. Further, our obligations will not be discharged and will not be otherwise prejudiced or adversely affected by any:

- time, lenience or tolerance which you may grant to the Contractor;
- amendment, modification or extension which may be made to the Contract or the Works performed under the Contract;
- intermediate payment or other fulfilment made by us;
- change in the constitution or organization of the Contractor; or
- other matter or thing which in the absence of this provision would or might have that effect, except a discharge or amendment expressly made or agreed to by you in writing.

This Guarantee may not be assigned by you to any person, firm or company other than an Affiliate, without our prior written consent, which must not be unreasonably withheld. You must notify us in writing of any assignment, after which we must make any payment claimed under this Guarantee to the person, firm or company specified in the notice which will constitute a full and valid release by us in relation to that payment.

Any notice required by this Guarantee is deemed to be given when delivered (in the case of personal delivery) or forty-eight (48) hours after being despatched by prepaid registered post or recorded delivery (in the case of letter) or as otherwise advised by and between the parties.

We agree that part of the Contract may be amended, renewed, extended, modified, compromised, released or discharged by mutual agreement between you and the Contractor, and this security may be exchanged or surrendered without in any way impairing or affecting our abilities under this Guarantee without notice to us and without the necessity of any additional endorsement, consent or guarantee by us, provided, however, that the Guaranteed Sum does not increase.

No action, event or condition which by any applicable law may operate to free us from liability under this Guarantee will have any effect. We waive any right we may have to apply such law so that in all respects our liability under this Guarantee will be irrevocable and, except as stated in this Guarantee, unconditional in all respects.

Capitalized words and phrases used within this Guarantee have the same meanings as are given to them in the Contract.

This Guarantee is governed by the Uniform Rules for Demand Guarantees, ICC Publication No. 758, provided that the supporting statement under Article 15 (a), and Articles 34 and 35 are excluded. Any disputes arising out or in connection with this Guarantee, or the breach, termination, or invalidity thereof will be referred to and finally resolved by arbitration in accordance with the UNCITRAL Arbitration Rules then in effect, the language of the proceedings being English.

Nothing in or relating to this Guarantee shall be deemed a waiver, express or implied, of any of the privileges and immunities of [*KOICA*] which are hereby expressly reserved.

IN WITNESS of which the [*Insert full name of Bank*] has duly executed this Guarantee on the date stated above.

SIGNED by [*insert*])
as attorney for [*insert*]) under power of attorney dated) [*insert*])
in the presence of)
)
.....) Signature of witness)
)
.....) Name of witness (block letters))
)
.....) Address of witness)
)
.....) Occupation of witness

By executing this agreement the attorney states that the attorney has received no notice of revocation of the power of attorney

Address for notices

[*insert address*]

FORM OF PARENT COMPANY GUARANTEE

[*Name of Parent Company*]

Date: [*Date of Issuance*]

To: [*KOICA*]

Dear [*KOICA*]

[*Name of Contract*]] Construction Contract - Parent Company Guarantee

You entered into a contract dated [*Insert date of Contract*] with [*Insert name of Contractor*] ("Contractor") titled [*Insert Name of Contract*] Construction Contract for the [*Insert name of Project*] for certain works and services ("Works") to be undertaken by the Contractor ("Contract").

The Contractor has agreed to procure the provision of a parent company guarantee ("Guarantee") from [*Insert name of Parent Company*] ("Guarantor").

The Guarantor guarantees to the Employer that the Contractor will perform, carry out, execute and discharge the duties, responsibilities and obligations (including contingent obligations and obligations to pay money) of the Contractor in connection with the Contract.

In the event that the Contractor fails to perform, carry out, execute and discharge any of the duties, responsibilities, obligations (including any contingent obligations and any obligations to pay money) and liabilities of the Contractor in connection with the Contract ("Default/s"), the Guarantor must, on demand from the Employer:

(a) perform, carry out and discharge in accordance with the Contract, the duties, responsibilities and obligations (including contingent obligations and obligations to pay money) the subject of the Default/s; and

(b) indemnify the Employer with respect to all damages, losses, costs, charges and expenses suffered by the Employer with respect to the Default/s to the extent to which the Contactor is liable to the Employer and the Employer has a right of recovery against the Contractor pursuant to the Contract.

Notwithstanding any provision in this Guarantee to the contrary, the Guarantor will have the full benefit of all defenses, set-offs, counterclaims, reduction, diminution or limitations of liability available to the Contractor pursuant to or arising from the Contract.

If a law requires the Guarantor to deduct:

(a) an amount in respect of any taxes, levies, imposts, charges and duties imposed by any authority (including stamp and transaction duties) ("Taxes"); or

(b) any interest, penalties, fines and expenses in connection with the Taxes

from a payment due under this Guarantee with the result that the Employer would not actually receive on the due date the full amount provided for under the Contract, the Guarantor must pay an additional amount so that the Employer receives from the Guarantor the full amount the Employer would have received on the

due date if no deductions had been required.

The provisions of this Guarantee will remain in full force and effect, even if:

(a) the Contract is varied, modified, changed or prematurely terminated; or

(b) the Contractor and/or the Employer is or may be in breach of the Contract.

This Guarantee will expire on the earlier of 10 years after the date of the final taking over certificate issued pursuant to the Contract or when all obligations and liabilities of the Contractor under the Contract have been carried out, completed and discharged in accordance with the Contract.

This Guarantee neither forms part of the Contract nor affects the provisions of the Contract.

The Guarantor acknowledges that the Employer is acting in reliance on the Guarantor incurring obligations and giving rights under this Guarantee.

The Guarantor acknowledges that the Employer is acting in reliance on the Guarantor incurring obligations and giving rights under this Guarantee.

Any disputes arising out or in connection with this Guarantee, or the breach, termination, or invalidity thereof will be referred to and finally resolved by arbitration in accordance with the UNCITRAL Arbitration Rules then in effect, the language of the proceedings being English.

Each person executing this Guarantee states that he or she has authority to represent and bind the Guarantor.

IN WITNESS of which the [*Insert name of Parent Company*] has duly executed this Guarantee on the date stated above.

SIGNED by [*insert*])
as attorney for [*insert*]) under power of attorney dated) [*insert*])
in the presence of)
)
.....) Signature of witness)
)
.....) Name of witness (block letters))
)
.....) Address of witness)
)
.....) Occupation of witness

By executing this agreement the attorney states that the attorney has received no notice of revocation of the power of attorney

Address for notices

[*insert address*]

Company

[*Insert name of Parent Company*]
Documents

[*Attached Documents*]
Form of opinion text

On the basis of the assumptions and subject to the qualifications set out in this opinion, we are of the opinion that:

(a) the Company is incorporated and validly existing under the laws of [insert country of incorporation] and is capable of suing and being sued in its corporate name;

(b) the company has:

(i) the corporate power to enter into each Document and to observe its obligations under them; and

(ii) taken all corporate action required on its part to authorize the execution, delivery and observance of each document;

(c) the obligations of the Company under each document are valid, binding and enforceable in accordance with its terms;

(d) the execution and delivery by or on behalf of the Company of each document and the observance by the company of its obligations under them has not violated and will not contravene:

(i) any law in force in [*insert relevant opinion country*] applicable to companies or transactions generally; or

(ii) any stock exchange rules and regulations of [*insert relevant opinion country*]; or

(iii) its constitution;

(e) each authorisation necessary under the laws in force in [insert relevant opinion country] applicable to companies generally for the company to enter into each Document and observe obligations under them has been obtained;

(f) the Documents are in proper form for enforcement in the appropriate courts of [*insert relevant opinion country*];

(g) claims against the Company under each document will rank at least equally with the claims of all its unsecured and unsubordinated creditors (other than creditors mandatorily preferred by law);

(h) the Company does not enjoy any immunity from suit in [*insert relevant opinion country*] nor are its assets exempt from execution;

[Annex 6]

Details of Contract Price

[This Annex should provide details of any provisional sum based on the total Contract Price. The unit price and rates set out in this Annex will form the basis of any adjustments to the Contract Price. To the extent incentives will be payable for early completion of the Construction, details of such incentives should also be included here.]

1. Contract Price

The Contract Price is the lump sum price of [*Insert Contract Price in figures and words.(e.g. USD 1,300,000 (one million three hundred thousand US Dollars)*].

2. Provisional Sum Items

The Provisional Sum items are set out in section [*insert*] of [*insert name of relevant document*].

Each Provisional Sum shall only be used, in whole or in part, and the Contractor will only be entitled to payment for a Provisional Sum, in accordance with Article 11.7 of the Contract and the Contract Price shall be adjusted accordingly.

3. Adjustments for Changes in Cost

[Unless the Laws of the Recipient Country mandatorily require the adjustment of the Contract Price upon the occurrence of price fluctuations, the right to adjust the Contract Price for price fluctuations should be excluded. Consider using one of the following.

(i) The Contract Price shall not be adjusted for changes (increases or decreases) in the cost of labor or materials; (ii) the Contract Price shall not be adjusted for any increase or decrease in the actual expenditure of the Contractor; (iii) Adjustments to the Contract Price for price fluctuations shall be based on the following formula only. If no objective criterion or standard exists for applying the following formula, adjustment of the Contract Price for price fluctuation shall not be valid under this Contract.]

Pn = a + b Ln/ Lo + c En/Eo + d Mn/Mo + ...

period "n", this period being [a month];

"a" is a fixed coefficient, stated in the relevant table of adjustment data, representing the non-adjustable portion in contractual payments;

"b", "c", "d", ... are coefficients representing the estimated proportion of each cost element related to the execution of the Works, as stated in the relevant table of adjustment data; such tabulated cost elements may be indicative of resources such as labour, equipment and materials;

"Ln", "En", "Mn", ... are the current cost indices or reference prices for period "n", expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the date 49 days prior to the last day of the period (to which the particular Payment Certificate relates); and

"Lo", "Eo", "Mo", ... are the base cost indices or reference prices, expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the Date of the Contract.

In cases where the "currency of index" (stated in the table) is not the relevant currency of payment, each index shall be converted into the relevant currency of payment at the selling rate, established by the central bank of the Country, of this relevant currency on the above date for which the index is required to be applicable.

The weightings (coefficients) for each of the factors of cost stated in the table(s) of adjustment data shall only be adjusted if they have been rendered unreasonable, unbalanced or inapplicable, as a result of Variations.]

Table of adjustment data:

Coefficient; Scope of index	Country of origin; Currency of index	Source of index; Title/definition	Value on stated date(s)	
			Value	Date
a =				
b =				
c =				
d =				
e =				

[Annex 7]

Contract Price Payment Schedule and Method

[This Annex stipulates the timing and method of paying the Contract Price. The Annex does not contemplate the early payment of the Contract Price due to the pre-ordering of materials, etc.]

1. Consider the following two options for dealing with payment of the advance payment amount.

   Either (i) pay the advance payment amount in accordance with Article 12.2 of the General Conditions, or (ii) do not require the payment of an advance payment.

2. Consider the following two options for dealing with payments for completed parts.

   Either (i) allow the Contractor to make demands for payment in accordance with Article 12.3 of the General Conditions on a monthly basis, or (ii) require the Contractor to make demands for payment upon the achievement of certain milestones (in this case, the milestones will also need to be specified).

3. With respect to payments regarding equipment or materials, consider having the Contractor make demands for the same (i) as part of payments for completed parts, or (ii) when the relevant equipment or material is brought onto the Construction Site.

4. If equipment or materials need to be pre-ordered, consider having the Employer pay a significant percentage of the Contract Price when the relevant equipment or materials are shipped in consideration of the delivery conditions of the goods.

[Annex 8]

Detailed Construction Schedule

(A) Approved Preliminary Program

(B) Milestone Dates

(C) Contract Program Requirements

[Annex 9]

Key Contractor Personnel

[Insert details of key Contractor Personnel involved in the Project and the Construction Works]

Key Contractor Personnel for the Project are:

No.	Position Description	Name
	[for example: Safety Manager, Quality control Manager, Environmental Manager, Site Manager, Site Foreman]	
1.	[insert position description]	[insert name]
2.	[insert position description]	[insert name]
3.	[insert position description]	[insert name]
4.	[insert position description]	[insert name]
5.	[insert position description]	[insert name]
6.	[insert position description]	[insert name]
7.	[insert position description]	[insert name]
8.	[insert position description]	[insert name]
9.	[insert position description]	[insert name]
10.	[insert position description]	[insert name]

If there is a position stated in this Annex but no person is named in that particular role, then the Contractor shall obtain the Employer's Construction Supervisor's approval before appointing a person to fill that role.

[Annex 10]

KOICA Safety Management Manual

[Separately attached]