



THE URBAN DEVELOPMENT CORPORATION OF TRINIDAD AND TOBAGO LIMITED (UDeCOTT)

REQUEST FOR PROPOSALS REFURBISHMENT AND OUTFITTING WORKS FOR THE GAMBLING CONTROL COMMISSION (GCC) CORPORATE OFFICE, ST VINCENT STREET, PORT-OF-SPAIN

The Urban Development Corporation of Trinidad and Tobago Limited (UDeCOTT) invites suitably qualified and experienced entities to submit proposals for the **Refurbishment and Outfitting Works of the Gambling Control Commission (GCC) Corporate Office, St. Vincent Street, Port of Spain.**

In accordance with the Public Procurement and Disposal of Public Property Act, 2015 (as amended), suppliers of goods, works and services, interested in conducting business with UDeCOTT must be registered on the OPR Procurement Depository. The relevant guidelines for registration can be found on the OPR website via <https://oprtd.org/procurement-depository/>. Therefore, UDeCOTT is inviting suitably qualified suppliers to register and apply for pre-qualification in the OPR's Procurement Depository for the following:

Line of Business Code: 72121103 – Commercial and Office Building Renovation and Repair Service

A request for the RFP packages can be submitted via email to tenders@udecott.com from **Monday March 18, 2024 (excluding weekends and public holidays)**, between the hours of **9:00 a.m. to 4:00 p.m. (AST)**.

The successful contractor shall be chosen using competitive selection process as set out in the Request for Proposals (RFP).

INFORMATION SESSIONS

An Online Information Session for the **Refurbishment and Outfitting Works of the Gambling Control Commission (GCC) Corporate Office, St. Vincent Street, Port of Spain**, will be held **via Microsoft Teams (Online)** on **Friday March 22, 2024 at 9:00 a.m.** This will be followed by a **Site Visit** on **Friday March 22, 2024 at 1:30 p.m.**

Interested parties are kindly asked to confirm their availability, together with the **names and preferred email addresses** of their representatives who will be in attendance, via email at tenders@udecott.com.

SUBMISSION

Proponents are advised that submissions must include ALL the documents as set forth in the RFP and must be in accordance with the terms therein.

Failure to do so may result in disqualification.

The deadline date for submission of proposals is **April 18, 2024 (AST)**.

Additional information may be requested through email forwarded to the attention of **The Office of the Chief Procurement Officer** at tenders@udecott.com.

UDeCOTT reserves the right to reject any or all proposals for failure to comply with any mandatory requirements stated in the RFP.

THE OFFICE OF THE CHIEF PROCUREMENT OFFICER

FREQUENTLY ASKED QUESTIONS (FAQs)

REFURBISHMENT AND OUTFITTING WORKS FOR THE GAMBLING CONTROL COMMISSION (GCC) CORPORATE OFFICE, ST VINCENT STREET, PORT-OF-SPAIN

What is the purpose of this Request for Proposal?

The purpose of the Request for Proposal is to identify and contract a suitably qualified and experienced Contractor to undertake the Project.

Are Proponents required to purchase the RFP package?

There will be no cost for the RFP packages.

When will the RFP be available?

Interested parties can request a copy of the RFP packages via email at tenders@udecott.com from Monday March 18, 2024 (excluding weekends and public holidays), between the hours of 9:00 a.m. to 4:00 p.m. (AST).

Are interested parties required to register with the Office of the Procurement Regulator?

Yes. Please be advised that in light of the proclamation of the Public Procurement and Disposal of Public Property Act, 2015, all proponent interested in conducting business with UDeCOTT must be registered on the OPR Procurement Depository. The relevant guidelines for registration can be found on the OPR website via <https://oprtd.org/procurement-depository/>. Proponents are required to apply for pre-qualification in the OPR's Procurement Depository for the following:

Line of Business Code: 72121103 – Commercial and Office Building Renovation and Repair Service

What is the Location of the site?

The Project Site is located at 76-78 St. Vincent Street, Port of Spain.

Is it mandatory to attend the site visit and online information session?

Attendance to the site visit and online information session is **not** mandatory. It does however provide a greater understanding of the requirements of the RFP.

Are there any eligibility requirements for this Procurement Process?

In order to be eligible for evaluation and/or consideration to provide the Works, Proponents must be able to demonstrate the following:

- Incorporation or otherwise registered to do business in Trinidad and Tobago as evidenced by the Certificate of Incorporation or Registration (as applicable);
- Submission of Statutory Clearance/Compliance Certificates, (for companies incorporated/registered in Trinidad and Tobago) valid as at the tender submission deadline, namely;
 - VAT Clearance Certificate
 - BIR Clearance Certificate
 - NIS Certificate of Compliance

Are Proponents required to submit a Bid Bond with their Proposals?

A Bid Bond valued at **One Hundred Thousand Dollars (\$100,000.00)**, is required for the Refurbishment and Outfitting Works of the Gambling Control Commission (GCC) Corporate Office, St. Vincent Street, Port of Spain.

Proponents are to note that the responses provided as guidance to these Frequently Asked Questions does not relieve the Proponent of its obligation and responsibility to fulfil and comply with all requirements of the Request for Proposals.

EMPLOYER'S REQUIREMENTS

**REFURBISHMENT AND OUTFITTING WORKS
GAMBLING CONTROL COMMISSION (GCC) CORPORATE
OFFICE, ST. VINCENT STREET, PORT OF SPAIN**

November 02, 2023

Revision_00

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I. OBJECTIVE

The government of Trinidad and Tobago recognized the need to effectively regulate the gambling and betting sectors since it has the potential to contribute meaningfully and positively to the national economy by creating employment, not only in the sector, but in other downstream sectors thereby creating greater tax revenues.

Consequently, the Gambling Control Commission of Trinidad and Tobago ("GCC") was established and one of the many function of this Commission is to regulate and control the operation of gambling in Trinidad and Tobago. In this regard, it is expected that the Commission will establish a licensing framework which will aid in minimizing the potential for money laundering and terrorist financing due to the stringent criteria that will have to be met in order to obtain a license to work in the gaming and betting sectors.

The purpose of this Employer's Requirements is to provide a detailed description of the user to guide Proponents in the preparation of their responses to the Request for Proposal (RFP) for the REFURBISHMENT AND OUTFITTING WORKS OF THE GAMBLING CONTROL COMMISSION (GCC) CORPORATE OFFICE, ST. VINCENT STREET, PORT OF SPAIN (herein referred to as "Project").

This Employer's Requirements shall be read in conjunction with the following appendices and shall be used as a guide by the Proponents in developing their proposals:

- Appendix 1 – Project Scope of Works
- Appendix 2 – Client Provided Space Requirements
- Appendix 3 – Conceptual Architectural Design
- Appendix 4 – Performance Specification
- Appendix 5 – GoRTT Outfitting Policy
- Appendix 6 – Structural Condition Assessment
- Appendix 7 – MEP Condition Assessment
- Appendix 8 – Bill of Quantities

The Project shall be completed within Eight (8) months upon issuance of Commencement Letter, with a 12-month Defect Notification Period upon successful issuance of Taking-Over Certificate to the Contractor.

II. THE SITE

The building is located at 76-78 St. Vincent Street in “downtown” Port of Spain - it is on the section of St Vincent Street bounded on the North by Oxford Street & in the South by Park Street



III. BASE SCOPE OF WORKS

In order to meet the functional needs of the client construction and outfitting works outlined, but not limited to those described below, are required on the St. Vincent Street property:

- a. Construction of interior partition walls & doors
- b. Modifications to existing ceilings
- c. Supply and installation of furniture & furnishings
- d. Supply and installation of floor & wall finishes
- e. Painting & Decorating
- f. MEP, HVAC, ICT & Security installations and retrofits to meet the spatial and functional requirements of the client
- g. Inclusion of wheelchair accessible washrooms
- h. Supply and installation of signage
- i. Supply and installation of cladding on the exterior of the building
- j. External works & landscaping

IV. GENERAL NOTES:

- a) The Contract Price is deemed to include for the design, construction, equipping, testing, commissioning, training, provision of “as built” drawings and records and operational and maintenance manuals.
- b) The Design-Build (“D-B”) Contractor shall conduct all the necessary investigations, studies and analyses, calculations, and prepare conceptual and final designs for the successful delivery of the Project. These will then serve as the groundwork for the subsequent construction stages.
- c) Duration of each service/works is in calendar days, inclusive of Saturdays, Sundays and public holidays.
- d) Units of system shall be in metric only, unless otherwise directed by the Client.
- e) All sketches, drawings, calculations, materials lists, bills of quantities, methodology, reports, and project schedules shall be submitted in both hard copy and digital format (electronic copy) via CD-ROM or any portable storage device e.g. USB flash drive.

Submittals	Hard Copy	Electronic Copy
Sketches and Drawings	<ul style="list-style-type: none"> ▪ Sketches & Drawings: minimum acceptable sheet size is 11” x 17” (3 copies) ▪ For-Construction Drawings: acceptable sheet size is in A1 only (3 copies). 	<ul style="list-style-type: none"> ▪ AutoCAD 2010 (or higher version) and PDF
Project Schedules	<ul style="list-style-type: none"> ▪ minimum acceptable sheet size is 11” x 17” 	<ul style="list-style-type: none"> ▪ MS Project 2010 (or above) and PDF
Reports, analysis, charts	<ul style="list-style-type: none"> ▪ minimum acceptable sheet size is 8.5” x 11” or as appropriate (colour printed on one side only) 	<ul style="list-style-type: none"> ▪ MS Word or/and MS Excel and PDF
Photography	<ul style="list-style-type: none"> ▪ Should be included in the report or as appropriate (colour printed on one side only) 	<ul style="list-style-type: none"> ▪ JPEG and PDF
Presentation	<ul style="list-style-type: none"> ▪ As appropriate (print on one side only) 	<ul style="list-style-type: none"> ▪ MS PowerPoint and PDF

- f) The Design-Build Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Design-Build Contractor shall remove the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not the property of the Government. Unsightly materials and debris, garbage, and equipment should be removed as required; while materials should be scheduled for delivery only as required for immediate use.

- g) Logistics: Staging / storage areas are to be advised by the project manager. The Design-Build Contractor shall provide all equipment needed for material transportation, equipment and labor to execute the project.
- h) Coordination: The Design-Build Contractor is also required to coordinate with other appointed UDeCOTT and Client appointed contractors for implementation of the works
- i) Removals: Any Items that effect the work space that need to be removed either temporarily and reinstated at a later date shall be accounted for by the Design-Build Contractor and identified prior to commencement of any work
- j) Waste Management: The Design-Build Contractor is required to keep the work site free from the accumulation of construction waste during construction and shall be responsible for the disposal of such waste off site. Upon completion of the project, the Contractor must remove all debris and trash from the site out of the compound.
- k) Final Preparation for Handover: Prior to Handover, the contractor is to ensure that the site is ready for occupation by the CLIENT. In this regard the contractor is required to ensure that the site is thoroughly cleaned and is responsible to:
 - Deep clean all soft surfaces left in place during construction
 - Clean all hard surfaces (floors, walls, cabinets, shelves etc.) of all dust and particulate matter
 - Remove and dispose of all packaging, stickers and labels on supplied products
 - Clean all lavatories and washrooms

V. STATUTORY REQUIREMENTS, DESIGN CODES & STANDARDS

- a) All design drawings, calculations and workmanship shall be delivered in accordance with, and in compliance with the Appendices of this Employer's Requirements, and the guidelines, regulations and statutory requirements of all Governmental Statutory and Regulatory Agencies, which include but not limited to:
- a) Town & Country Planning Division (TCPD)
 - b) Ministry of Works and Transport (MOWT) e.g. Designs Branch, Highways Division, Traffic Management Branch, Drainage Division, and other applicable Divisions
 - c) Water and Sewerage Authority (WASA)
 - d) Trinidad and Tobago Electricity Commission (T&TEC)
 - e) Port of Spain City Corporation
 - f) Local Health Authorities
 - g) Occupational Safety and Health Authority (OSHA)
 - h) Regional Corporations
 - i) Trinidad and Tobago Fire Services Authority
 - j) Environmental Management Authority (EMA)
 - k) Telecommunications Services of Trinidad & Tobago (TSTT)
 - l) Ministry of Energy (MoE)
 - m) Trinidad and Tobago Bureau of Standards
- b) The codes and standards to be used in the designs are listed below at a minimum. The D-B Contractor may propose other codes and standards as long as same is acceptable to the guidelines, regulations and statutory requirements of all Governmental Statutory and Regulatory Agencies of Trinidad and Tobago.

❖ **Architectural Designs**

PLANNING

- Town and Country Planning Regulations
- Regional Corporation Regulations

**BUILDINGS/
STRUCTURES**

- International Building Code (IBC) 2018.
- Caribbean Uniform Building Code (CUBIC)
- AWPA U1 – User Specification for Treated Wood: 2018
- American Society of Civil Engineers code ASCE-7-05
- International Building Code (IBC) for earthquake loading using equivalent static analysis and compared to CUBIC. A peak ground acceleration of 0.4g shall be used.
- American National Standards Institute (ANSI)
- American Concrete Institute ACI 318
- American Institute of Steel Construction (AISC manuals)
- ASHRAE Standard 189.1 (Latest version)

- | | |
|-------------------------|--|
| | <ul style="list-style-type: none"> • BOMA 2017 Standard for Office Buildings: Standard Methods of Measurement ANSI/BOMA Z65.1-2017 |
| OFFICE FURNITURE | <ul style="list-style-type: none"> • The Suite of BIFMA Standards for commercial office furniture |
| LIFE SAFETY | <ul style="list-style-type: none"> • NFPA 101-2018 – Life Safety Code • NFPA 1-2018 – Fire Code |
| UNIVERSAL ACCESSIBILITY | <ul style="list-style-type: none"> • Accessible and Usable Buildings and Facilities ANSI A177.1:2017 |
| SUSTAINABILITY | <ul style="list-style-type: none"> • LEED v4 Guidelines |
| LOCAL REGULATIONS | <ul style="list-style-type: none"> • GORTT Office Outfitting Policy • The Occupational Safety and Health Act 1, 2004 as amended 2006 |

❖ **Structural Engineering Designs**

Local Codes and Standards as per Ministry of Works and Transport (Design Engineering Branch)

- a) Vertical Loads:
ASCE 7 - 05
- b) Earthquake Loads
IBC 2009
ASCE 7-05
Refer to Seismic Research Unit website <http://www.uwiseismic.com/Maps.aspx> for Hazard Maps of Trinidad and Tobago
- c) Wind Loads
ASCE 7 - 05
(Trinidad 117mph, Tobago 130mph – 3 sec. Gust for Trinidad and Tobago)
- d) Reinforced Concrete Designs
ACI 318-05 for IBC 2006
- e) Structural Steel
AISC 341 – 05 including Supplement No. 1 dated 2006
AISC 360 – 05
AISC 358 - 05 including Supplement No. 1 dated 2009

- f) Structural Masonry
 - ACI 530-05
 - ASCE 5-05
 - TMS 402-02
- g) General Requirements for Seismic Structural Design:
 - 1. Every structure and every portion thereof shall, as minimum, be designed, detailed and constructed to resist the effects of seismic ground motions. Additionally all detailing must be in accordance with the material standards referred to in the Code used for the particular force resisting systems.
 - 2. Where code prescribed wind design produces greater effects, seismic design detailing requirements and limitations pre- scribed in the approved codes IBC 2009 shall be followed.
 - 3. A continuous load path, with adequate strength and stiffness shall be provided which will transfer all forces from the place of application to the resisting elements.
 - 4. Where calculations include the results from a computer program, the following information must be submitted:-
 - i. A labelled drawing of the complete structural model used to represent the structure in the computer-generated analysis;
 - ii. At the discretion of the building official, a presentation/demonstration of the use of the program for the design shall be required;
 - iii. Input Data shall be provided via a printout from the structural program used;
 - iv. Where the structural design is generated via the computer software/programme, hand calculations or detailed spreadsheets for each typical Primary structural element must be provided, as required by the building official.

International Codes (Latest Edition)

- h) International Building Code (IBC)
- i) American Society of Civil Engineers - ASCE 7-95 Minimum Design Loads for Buildings and other structures – Live Loads and Wind Loads
- j) BS 8110:Part 2, Structural Use of Concrete
- k) Uniform Building Code (UBC)
- l) 2000 Uniform Structural Fire Code (UFC)

North America Codes

- m) ACI - American Concrete Institute

- n) ACI - American Concrete Institute publications to be utilized in the design of concrete and masonry structural elements in accordance with the requirements of IBC 2006 and ASCE 7:
- o) 318-05: Building Code Requirements for Structural Concrete and Commentary
- p) 530-05: Building Code Requirements for Masonry Structures and Commentary
- q) AISC - American Institute of Steel Construction publications to be utilized in the design of structural steel structural elements in accordance with the requirements of IBC 2006 and ASCE 7:
- r) 303-05: Code of Standard Practice for Steel Buildings and Bridges
- s) 325-05: Steel Construction Manual – Thirteenth Edition
- t) 327-05: Seismic Design Manual
- u) AISI - American Iron and Steel Institute
- v) ANSI - American National Standards Institute
- w) ASTM - American Society for Testing and Materials
- x) ASCE - American Society of Civil Engineers

❖ **Mechanical Engineering Designs**

AMSE B31	Standards of Pressure Piping
ASME B16	Standards of Pipes and Fittings
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
ASHRAE 55	Thermal Environmental Conditions for Human Occupancy
ASHRAE 90.1	Energy Standard for Buildings except Low-Rise Residential Buildings
ASHRAE 62.1	Ventilation for Acceptable Indoor Air Quality
ICC IC 2007	2007 Supplement to the International Codes
ICC IFC 2006	2006 International Fire Code
ICC IPC 2006	2006 International Plumbing Code
ICC IMC 2006	2006 International Mechanical Code
ICC IFGC 2006	2006 International Fuel Gas Code
ICC IECC 2006	2006 International Energy Conservation Code
ICC IWUIC 2006	2006 International Wildland-Urban Interface Code
ICC IEBC 2006	2006 International Existing Building Code
ICC IPSDC 2006	2006 International Private Sewerage Disposal Code
NFPA 10	Standards on Portable Fire Extinguishers
NFPA 13	Standard for the Installation of Sprinkler System
NFPA 15	Standard water spray fixed systems for fire protection
NFPA 14	Standard for the Installation of Standpipes and Hose Systems
NFPA 22	Water Storage Tank Systems

❖ **Electrical Engineering Designs**

IBC	International Building Code
TTBS	Trinidad and Tobago Bureau of Standards

TTS-171	Trinidad and Tobago Electrical Wiring Code
ANSI C34.2	Substation Transformers and Rectifier Units
ANSI C37.13	Low Voltage AC Breakers
ANSI C37.14	Low Voltage DC Breakers
ANSI C37.16	Low Voltage Breakers and AC Protectors
ANSI C57.12.01	Transformer - General Requirements for Dry Type Distribution
ANSI C63.12	Electromagnetic Compatibility
ANSI C7.14	Stranding of Conductors
ANSI C80.3	Electrical Metallic Tubing, Zinc-Coated
ICEA Class H	Flexible Cables
IEEE 730	Software QA Plans
IEEE 830	Recommended Practice for Software Requirements Specifications
NEC	2008 National Electrical Code
NFPA 70	National Electric Code
NFPA 72	National Fire Alarm Code
NFPA 780	Standard for the Installation of Lightning Protection Systems
UL 96A	Lightning Protection
IEEE Std 1100	Powering and Grounding Electronic Equipment

VI. PRINCIPLE DESIGN-BUILD CONTRACTOR RESPONSIBILITIES

- Design Development
- Product Specifications
- Statutory Approvals relevant to works (e.g. Fire Approval, Electrical, WASA etc.)
- Project Programme & Works Scheduling
- Project Insurances
- Contractor Accreditation
- Project Delivery
- Contract Management
- Subcontractor Coordination and verification of works
- Health Safety, Security and Environmental Management during the works
- Construction Phase HSSE Plan and Risk Assessment
- HSSE Set Up & Welfare
- Personal protective equipment (safety glasses, vests, boots, vests)
- Job Safety Analysis, Site Safety Induction, Tool box talks
- First Aider and First Aid Kit
- Fire Warden
- Certification of equipment and equipment users (where applicable)
- Safety and Evacuation Signage
- Site Security
- Site Evacuation Plan

REFURBISHMENT AND OUTFITTING WORKS
GAMBLING CONTROL COMMISSION (GCC) CORPORATE OFFICE, ST. VINCENT STREET, PORT OF SPAIN



- Site Waste Management and disposal
- General labour
- Site Cleaning
- Practical Completion/Final Account Applications
- Operations Manuals (O&M) Contractor Accreditation
- Engineer's Accommodation and Equipment
- Project Report i.e. Monthly, and 2-week look ahead
- Procurement i.e. local and imported items

VII. DESIGN REQUIREMENTS

a. Design Generally

A conceptual design for the proposed project has been provided to guide the Contractor in preparing the enhanced Conceptual and Final Design. The Employer's Requirements and its appendices must be reviewed by the Contractor for compliance with the codes and applicable standards in executing the project.

The Contract Price is deemed to include for the mobilization, design, construction, equipping, testing, commissioning, training, demobilisation, provision of "as built" drawings, and records and operational and maintenance manuals, and other documentation as required.

b. Design Development

Design development will be carried in accordance with the Contractor's Programme. This stage will include architectural and services designs, updated outline specifications and equipment schedules.

- Detail Design - During the detail design phase technical design(s) and specifications, sufficient to co-ordinate components and elements of the project and information for statutory standards and construction safety will be prepared.
- Pre-Construction - The Contractor shall prepare detailed information for construction purposes and submission to statutory authorities and agencies.
- Construction - Following submission and approval of the insurances, the site shall be handed over to the Contractor and construction work will commence.
- Post Taking Over - The Contractor shall rectify any defects notified during this period and shall ensure that the Ministry of Health Administration Building functions in accordance with the approved designs and specifications.

The Contractor shall provide "as built" drawings of the Interior Design, fixed furniture layouts and their services components and systems for:

- Architecture (Interior Design, furniture and equipment)
- Structural Works
- Electrical (High and Low Voltage)
- Fire Detection & Suppression System
- Security System
- Mechanical (Air Conditioning , Ventilation, Elevator)
- Plumbing (Potable & Waste water)

The Contractor shall compile and provide three (3) copies of all operational manuals, manufacturer's instructions, maintenance manuals and the like to the Employer.

The Contractor shall provide training to Maintenance Staff and others as required by the Employer and described by these Employer's Requirements.

c. Design Management

▪ Design Milestones

The Contractor shall manage design in such a way to ensure that all information is provided in time to allow for the construction process to proceed in accordance with the agreed programme. The Contractor shall demonstrate to the Engineer that this effective management is put in place and maintained throughout the entire contract period.

To this end, the Contractor shall identify Design Milestones when critical stages of the design process have to be achieved. Generally, the attaining of such milestones should be identified as having been reviewed by the Engineer and a "no objection" certificate (see Design Reviews paragraph below) having been issued.

▪ Design Submissions

The Contractor will make design Submissions to the Engineer in accordance with the Approved Submittal Procedures.

▪ Material Submissions

The Design-Build Contractor shall prepare and submit Engineering technical specifications and Product data of all materials to be used in the project. This shall list the materials in sufficient detail that approval for the materials and equipment can be granted without further elaboration; if needed a sample should be provided.

▪ Design Reviews

The Engineer shall receive for review the design calculations, drawings, diagrams, manufacturers' details and instructions, temporary works designs and the like and will review these Contractor's Documents in accordance with the Contract, Employer's Requirements and Appendices.

d. Design Parameters and Contractor's Responsibility for Basic Design Data

The designs are to be determined by internationally acceptable design methods. All Data to be provided in Metric Format with all dimensional data provided in the SI system of metric units.

The Contractor shall verify all data provided by the Employer and shall produce designs which are based on that data.

- Functional Requirements – shall be in accordance with this Employer's Requirements and the Appendices.

- Security Requirements - The Contractor will provide security requirements as set out in these Employer's Requirements and their Appendices.
- Safety Requirements - The Trinidad & Tobago Fire Services shall approve all designs. Fire resistance of structural components and separating walls shall be in accordance with the International Building Code.
- Fire Detection within structures shall be automatic and shall comply with the International Building Code.
- Earthquake Resistance - International Building Code (IBC) for earthquake loading using equivalent static analysis and compared to CUBIC. A peak ground acceleration of 0.4g shall be used.
- Aesthetic Design - The Interior Design shall conform to best practice and overall design shall aesthetically enhance the interior spaces generally.
- Environmentally Sensitive Design - The Contractor shall provide designs, specifications, and construction that minimize adverse effects on the exterior environment; enhance the quality of the environment; and minimize the consumption of energy, water, construction materials, and other resources. Further, the Contractor shall take into account the impact of construction activities on the environment and existing infrastructure. This shall include the control of noise, vibration and dust during construction.
- Service Life - The planned service life of the Interior Design shall be 50 years. The planned service life of all mechanical, electrical and electronic equipment shall be 15 years. The planned service lives shall take into account the maintenance requirements of the relevant materials and equipment.
- Design Standards – shall be in accordance with the Employer's Requirements and Appendices.
- Noise & Vibration - All mechanical, electrical and electronic equipment shall be of low noise. All equipment should be mounted and installed to avoid the transmission of noise and vibration to adjacent rooms or buildings.

VIII. HEALTH, SAFETY, SECURITY AND ENVIRONMENT REQUIREMENTS

- All Works must conform with Local OSH regulations and best practices
- Job Safety Analysis (JSA) meetings must be conducted for each element of work and sufficiently
 - documented during the life of the project
- Designated Design-Build Contractor Supervision must be provided during work hours
- Designated UDeCOTT Supervision must be facilitated during work hours
- Appropriate PPE must be worn by all site personnel at all times
- All site personnel must be identifiable with reflective vests and contractor issued ID badges
- Construction waste must be accumulated and disposed of appropriately
- Lobby areas for contractor assigned lifts must be isolated from staff/public
- All staff/public spaces which the Design-Build Contractor uses during afterhours must be cleaned
 - and restored for use before 5am the following work day
- Safety signage must be placed at all public interfaces notifying staff/public of ongoing works
- Elevator to be used by Design-Build Contractor must be left on priority control to prevent staff/public access and this control is to be managed by the contractor

IX. D-B SERVICES STAGES AND DURATION

SERVICE STAGE	DESCRIPTION OF SERVICES	DURATION
STAGE 1	Mobilization and Site Evaluation	<ul style="list-style-type: none"> - 1 month (maximum duration) - To commence on the date as stated in the Commencement Letter.
STAGE 2	Final Drawings and Other Design Documents	<ul style="list-style-type: none"> - 2 months (maximum duration) - To commence on the date as stated in the Commencement Letter.
STAGE 3	Execution Stage (Construction)	<ul style="list-style-type: none"> - 5 months Construction works (Main Building, External Works and any other ancillary works) - To commence on completion of Stage 2 or whenever practicable (whichever is earlier), and will end upon confirmation of Practical Completion by UDeCOTT.
STAGE 4	Project Close Out and Post-Construction	<ul style="list-style-type: none"> - 1 month Project Closeout i.e. Snagging, Testing and Commissioning; - To commence on completion of Stage 3 - 12 months DNP and will start upon issuance of Taking Over Certificate, and will end upon issuance of the Performance Certificate to the Contractor and successful financial close-out

STAGE 1: MOBILIZATION AND SITE EVALUATION

Provide evaluation of the Site and its existing facility as it relates to the development and completion of final design documents.

Stage 1 Goals:

1. Site Evaluation as needed in the preparation of design drawings.

Stage 1 Designated Services:

- Condition Survey
 - Determination of the need or requirements in relation to the current condition of the building.
- Risk Assessment Report
 - Risk Identification and Assessment, detailing the probabilities and severities of all identified risks;
 - Risk Management Impact and Control Action;
 - Recommendation and way forward.

Stage 1 Deliverables:

- Mobilization Report inclusive of Staging/Mobilization layout and Traffic Management;
- Work Programme up to level 5
- Project Specific HSSE Plan
- Project Specific QA/QC Plan with Inspection Forms
- Cash Flow projections
- Manpower and Equipment Resource List
- Condition Survey Report;
- Risk Assessment Report;
- Photographs.

STAGE 2: DESIGN DEVELOPMENT

Prepare, complete and submit conceptual and final design documents.

Stage 2 Goals:

- a) Production of coordinated design drawings and calculations.
- b) Complete all required documentations necessary for execution.
- c) Submission and obtainment of all required statutory approvals.

Stage 2 Designated Services:

1. Final Design Drawings
 - a) Architectural inclusive of FF+E (lay-outs with FF+E, elevations, sections, 3D rendering, perspective, schedules, stairs, details, etc.);
 - b) Life Safety/Fire Detection and Suppression;
 - c) Mechanical;
 - d) HVAC;
 - e) Electrical;
 - f) Plumbing;
 - g) Civil Works / Site Development / External Works/Landscaping/Illumination;
 - h) Schedules e.g. FF+E, Cabinetries and Shelving, Doors, Windows, Ironmongeries, Finishes, Paint Colour, etc.
2. Design Documentation – Design Calculations, Technical Specifications, Methodology, Data Sheets, Brochures, Procurement Schedule, list of materials to be procured (locally and imported), complete FF+E Listing.
3. Presentation Services include presenting design development drawings as required.

Stage 2 Deliverables:

1. Submission of conceptual and final design documents (3 copies and e-copy) which includes, but should not be limited to design drawings, design calculations, Design Criteria and Technical Specification / Recommendations / Guidelines to the:
 - Architectural (schematics, plans, lay-outs with FF+E, elevations, sections, 3D rendering, perspective, schedules, stairs, details, etc.);
 - Life Safety/Fire Detection and Suppression;
 - Mechanical;
 - HVAC;
 - Electrical;
 - Plumbing;
 - Civil Works / Site Development / External Works/Landscaping/Illumination;

- Schedules e.g. FF+E, Cabinetries and Shelving, Doors, Windows, Ironmongeries, Finishes, Paint Colour, etc.
2. Submission of Design Calculations (if applicable), Technical Specifications, Methodology, Procurement Schedule, list of materials to be procured (locally and imported), complete FF+E Listing.
 3. Submission of Material for Approvals attaching the relevant Data Sheets, Brochures, drawings, etc.
 4. Submission of methodology to each work activities.
 5. Submission and obtainment of all Statutory Approvals (whenever if required and in compliance to law). If not available at the moment, the acknowledgement receipt from the Statutory Authorities (as an evidence of application) is acceptable.

STAGE 3: EXECUTION STAGE (CONSTRUCTION)

UDeCOTT will provide Contract Administration of the project, while the D-B Contractor will execute the works in conformance with the approved drawings and specifications, within stipulated time and budget.

The D-B Contractor shall also provide the necessary technical support, supervision by qualified professionals, and inspection with UDeCOTT as required prior to next phase of each activity, to ensure project is quality wise workmanship, within time and not exceeding the budget.

During weekly progress meetings, the D-B Contractor shall provide a two (2) week look-ahead schedule. This schedule shall show the work accomplished during the prior week, and work activities to be accomplished for the following two (2) weeks. If there are activities not completed within the two (2) week look-ahead schedule, the D-B Contractor shall undertake all means possible to complete those line item tasks within the time-frame required by the Engineer, without any additional cost or time extension.

The Contractor shall institute a quality assurance and control system to demonstrate compliance with the requirements of the Contract. The system shall be in accordance with the details stated in the Contract. The Engineer shall be entitled to audit any aspect of the system and make alterations to the quality inspection documents and make recommendations of checklist documents prior to inspections to improve the efficiency of these checks of finishes.

Monthly progress reports shall be prepared by the D-B Contractor and submitted to the Engineer in three (3) hard copies and one (1) electronic copy in a format approved and accepted by the Engineer. The first report shall cover the period up to the end of the first calendar month following the Commencement Date. Reports shall be submitted monthly thereafter, each within five (5) days after the last day of the period to which it relates.

STAGE 4: PROJECT CLOSE OUT AND POST CONSTRUCTION

Provide administration and spearhead closing out of the project. Further, provide professional representation of continuation basis for the project until end of Defects Notification Period.

Stage 4 Designated Services and Deliverables:

1. Participate and provide report to all testing and fine tuning of all Contractor Supplied plant and equipment;
2. Conduct testing & commissioning to all Contractor-Supplied plant and equipment;
3. Conduct snag listing exercise and rectify identified snags;
4. Conduct final inspections;
5. Submission of keys with appropriate housing and tags;
6. Submit As-built drawings;
7. Submit Operation & Maintenance manuals;
8. Submit Facility Maintenance Management plan;
9. Submission of Warranties/Guarantees;
10. Submission of Training Modules and conduct of Training;
11. Submission of final approval certificates from statutory authorities;
12. Prepare and submit final taking over report;
13. Conduct fortnightly visits during Defects Notification Period (DNP);
14. Provide solution to defects arising during DNP without cost to the Client;
15. Prepare and submit detailed project close-out report.

X. APPENDICES:

APPENDIX 1 – PROJECT SCOPE OF WORKS

APPENDIX 2 – CLIENT PROVIDED SPACE REQUIREMENTS

APPENDIX 3 – CONCEPTUAL ARCHITECTURAL DESIGN

APPENDIX 4 – PERFORMANCE SPECIFICATION

APPENDIX 5 – GORTT OUTFITTING POLICY

APPENDIX 6 – STRUCTURAL CONDITION ASSESSMENT

APPENDIX 7 – MEP CONDITION ASSESSMENT

APPENDIX 8 – BILL OF QUANTITIES



PROJECT SCOPE OF WORKS

DESIGN – BUILD

REFURBISHMENT & OUTFITTING WORKS

GAMBLING CONTROL COMMISSION (GCC)

CORPORATE OFFICE, ST VINCENT ST, POS

The Urban Development Corporation of
Trinidad and Tobago (UDeCOTT)

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PRINCIPLE DESIGN-BUILD CONTRACTOR RESPONSIBILITIES	3
DESIGN REQUIREMENTS	4
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HSSE REQUIREMENTS	5
REFERENCE DOCUMENTS	5
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OVERVIEW

Client:

The Gambling Control Commission of Trinidad & Tobago (GCC)
#25 Western Main Road
St James
Trinidad & Tobago
235-4GCC (4422)

Location of project:

76-78 St.Vincent Street, Port of Spain

Development Overview:

In 2022 instruments of appointment were presented to the first Board of the Gambling (Gaming and Betting) Control Commission

The commission was put in place to as part of the regulatory framework to address concerns arising out of private member clubs providing casino-style games their membership.

In the operationalization of the commission, they have been allocated four (4) properties across Trinidad and Tobago in order to effectively perform their mandate.

The subject of this proposal is a property located at 76-78 St. Vincent St., Port of Spain, which has been designated as the “Corporate Office” for the GCC; thus, the GCC is seeking to execute construction and outfitting works on said property to support its functions.

GOALS AND OBJECTIVES

In order to meet the functional needs of the client, construction and outfitting works outlined, but not limited to those described below, are required on the St. Vincent Street property:

1. Construction of interior partition walls & doors inclusive of glazing in private offices, meeting spaces, amenity spaces & walls subdividing departments
2. Modifications to existing ceilings to meet new layouts & as required for MEP retrofits
3. Supply and installation of furniture & furnishings
4. Supply and installation of floor & wall finishes as required for functionality inclusive of carpet tiles, luxury vinyl tiles, porcelain tile gym flooring, roof tiles etc.
5. Painting & Decorating inclusive of the provision of artwork
6. Mechanical, Electrical & Plumbing (MEP) installations and retrofits to meet the spatial and functional requirements of the client

7. Heating Ventilation & Air-conditioning (HVAC) installations and retrofits to meet the spatial and functional requirements of the client
8. Information & Communication Technology (ICT) & Security installations and retrofits to meet the spatial and functional requirements of the client
9. Inclusion of wheelchair accessible washrooms
10. Supply and installation of signage (internal & external inclusive of room signage)
11. Supply and installation of cladding on the exterior of the building
12. Roofing works inclusive of making good concrete roof & extension of roof to rear of ground floor parking.
13. External works & landscaping

In this regard, the objectives of the Project are as follows:

1. Execute the desired design and construction of the works meeting all Client and statutory requirements
2. Incorporate the recommendations of the Government Outfitting Policy
3. Provide quality refurbishment works and office spaces to meet the requirements of the client.
4. Complete all works within schedule
5. Complete works within designated budget

PRINCIPLE DESIGN-BUILD CONTRACTOR RESPONSIBILITIES

1. Product Specifications
2. Statutory Approvals relevant to works (Fire Approval, Electrical, WASA etc.)
3. Project Programme & Works Scheduling
4. Project Insurances
5. Contractor Accreditation
6. Project Delivery
7. Contract Management
8. Subcontractor Coordination and verification of works
9. Health Safety, Security and Environmental Management during the works
10. Construction Phase HSSE Plan and Risk Assessment
11. HSSE Set Up & Welfare
12. Personal protective equipment (safety glasses, vests, boots, vests
13. Job Safety Analysis
14. Site Safety Induction
15. Tool box talks
16. First Aider and First Aid Kit
17. Fire Warden
18. Certification of equipment and equipment users (where applicable)
19. Safety and Evacuation Signage
20. Site Security
21. Site Evacuation Plan

- 22. Site Waste Management and disposal
- 23. General labour
- 24. Site Cleaning
- 25. Practical Completion/Final Account Applications
- 26. Operations Manuals (O&M) Contractor Accreditation

DESIGN REQUIREMENTS

The Design-Build Contractor shall be required to provide project documentation and drawings for:

- Architecture
- Structural
- Electrical (Power & Communications)
- Information and Communication Technologies (ICT)
- Fire Detection & Security
- Mechanical (Air Conditioning & Ventilation)
- Plumbing (Potable & Waste water)
- As-built drawings for all of the above

Material Submissions: The Design-Build Contractor shall be required to prepare and submit Engineering technical specifications and Product data of all materials to be used in the project. This shall list the materials in sufficient detail that approval for the materials and equipment can be granted without further elaboration specifications; if needed a sample should be provided.

BUILDING WORKS

The Works to be performed by the Design-Build Contractor shall include, but not limited to:

- i. Demolition Works and disposal of materials
- ii. Finishes
 - a. Wall Finishes (Wall Painting and Coating, Acoustical Wall Treatment, Wall Finish Supplementary Components, Special Wall Surfacing etc.)
 - b. Floor Finishes (Carpeting, Flooring Treatments, Tile Flooring, Specialty Flooring etc.)
 - c. Ceiling Finishes (Plaster and Gypsum Board Finish, Ceiling Panelling, Ceiling Painting and Coating, Acoustic Ceiling Treatment, Suspended Ceilings etc.)
- iii. Interior Doors & Ironmongery (Interior Special Function Doors, Interior Access Doors and Panels, Interior Door Supplementary Components)
- iv. Interior Windows (Interior Special Function Windows, Interior Window Supplementary Components etc.)
- v. Plumbing
 - a. Domestic Plumbing (where required)
 - b. Sanitary Plumbing (where required)

- vi. Electrical (New and Modifications to existing system)
 - a. Power (Panels, Plugs, Wiring, Conduit, etc.)
 - b. Lighting (Lighting Control, Lighting Fixtures, Panels, Wiring, Supports, etc.)
 - c. Security
- vii. HVAC Works (Modifications to Existing System Where Necessary)
 - a. Ventilation and Air Condition (HVAC Air Distribution, Facility Distribution Systems, Supplementary Components Commissioning & Balancing)
 - b. Duct and Insulation works.
- viii. Fire Protection Works (Modification and interconnection to Existing System where necessary)
 - a. Fire Alarm System
 - b. Fire Suppression Systems
- ix. Information and Communication Technology (ICT) Works
 - a. Voice and Data Communications Infrastructure and Cabling
 - b. Access Control Systems Infrastructure
- x. Site Maintenance and Management
- xi. Snagging, testing
- xii. Site Cleaning and Handover: Obtain all necessary permits, licenses, insurance, etc. necessary for the execution of the works;

HSSE REQUIREMENTS

- **All Works** to conform to Local OSH regulations and best practices
- Job Safety Analysis (JSA) meetings to be conducted for each element of work
- Designated UDeCOTT Supervision will be provided during work hours
- Designated Design-Build Contractor Supervision will be provided during work hours
- Appropriate PPE will be worn by all site personnel
- All site personnel must be identifiable with reflective vests and contractor issued ID badges
- Construction waste will be accumulated and disposed appropriately
- Lobby areas for contractor assigned lifts will be isolated from staff/public
- All staff/public spaces which the Design-Build Contractor uses during afterhours must be cleaned and restored for use before 5am
- Signage will be placed notifying staff/public of ongoing works
- Elevator to be used by Design-Build Contractor will be left on priority control to prevent staff/public access

REFERENCE DOCUMENTS

This document is to be used collaboratively with the following:

- Drawings: “For Tender” Conceptual Design
- Performance Specifications
- Pricing Schedule

GENERAL NOTES

The Design-Build Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Design-Build Contractor shall remove the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not the property of the Government.

Unightly materials and debris, garbage, and equipment should be removed as required; while materials should be scheduled for delivery only as required for immediate use.

The Design-Build Contractor shall be required to prepare and submit material submissions inclusive of design documents outlined in the performance specification to be used in the project.

- **Logistics:** Staging / storage areas are to be advised by the project manager. The Design-Build Contractor shall provide all equipment needed for material transportation, equipment and labor to execute the project.
- **Coordination:** The Design-Build Contractor is also required to coordinate with other appointed UDeCOTT and Client appointed contractors for implementation of the works
- **Removals:** Any Items that effect the work space and need to be removed either temporarily and reinstated; or need to be removed altogether and reinstated with new shall be accounted for by the Design-Build Contractor and identified and agreed prior to commencement of any work
- **Finishing & Clean up:** Restore all items to their existing conditions; The Design-Build Contractor shall be required to keep the work site free from debris and trash at all time, upon completion of work contractor must remove all debris and trash from the site out of the compound.

Trinidad and Tobago Gambling Control Commission							
Space Requirements 2023							
#	Division	Officer/Office	Required Space (Sq. Ft.)	Type of Work Area	Details	Comments	
6	Board of Commissioners				Enclosed space with access control entry for the Board		
		Chairman	255	Office (Full height)	The office requires washroom, kitchenette, Mini Refrigerator and Television		
		Executive Assistant	100	Cubicle 54"			
		Filing Space	80	Filing area			
		Chairman Conference Room	200	Enclosed room			
		Chairman Board Room	400	Enclosed room	Sound proof, AV/ 15 persons max capacity		
		Board of Directors	170	170 (Full height)			
		Corporate Secretary	150	Office (Full height)			
		Corporate Secretary Assistant	2*(100)	Cubicle 54"			
		Filing Space	80	Filing Area			
		Sub Total	1635				
7	Executive						
		Chief Executive Officer	250	Office (Full height)	A kitchenette is required, Mini Refrigerator and Television	Enclosed space with access control entry	
		Executive Assistant	100	Cubicle 54"			
		Filing Space	80	Filing area			
		Chief Operations Officer	215	Office (Full height)	Television	Enclosed space with access control entry	
		Administrative Assistant	2*(100)	Cubicle 54"			
		Filing Space	80	Filing area			
		Chief Financial Officer	215	Office (Full height)	Television to be included	Enclosed space with access control entry	
		Administrative Assistant	100	Cubicle 54"			
		Filing Space	80	Filing area			
		Sub Total	1320				
21	Human Resources						
		Head of Human Resource	150	Office (Full height)	Enclosed space with access control entry		
		Human Resource Manager	120	Office (Full height)			
		Senior Human Resource Officer	100	Cubicle 84"			
		Human Resource Officers (02)	2*(100)	Cubicle 72"			
		Human Resource Assistants (02)	2*(100)	Workstation 54"			

Trinidad and Tobago Gambling Control Commission							
Space Requirements 2023							
#	Division	Officer/Office	Required Space (Sq. Ft.)	Type of Work Area	Details	Comments	
		Industrial Relations Officer	100	Cubicle 72"			
	Corporate Communications	Corporate Communications Manager	120	Office (Full height)			
		Senior Communications Officer	100	Cubicle 84"			
		Driver/ Messengers	3*(100)	Workstation 54"			
		Communications Assistant	2*(100)	Workstation 54"			
	Corporate	Senior Administrative Officer	100	Cubicle 84"			
		Corporate Services Officer	100	Cubicle 72"			
		Corporate Services Assistant	2*(100)	Workstation 54"			
	Facilities	Facilities Manager	120	Office (Full height)			
		Facilities Officer	100	Cubicle 72"			
		Filing Space	100	Filing Area			
	Sub Total		2310				
1	Investigations & Enforcement	Head of Enforcement and Investigations	150	Office (Full height)	Enclosed space with access control entry	Temporary Office Space (Officer is stationed in Chag Office)	
	Sub Total		150				
9	Legal Unit	General Counsel	215	Office (Full height)	Enclosed space with access control entry		
		Administrative Assistant	100	Cubicle 54"			
		Senior Administrative Officer	100	Cubicle 84"			
		Legal Counsel	4*(100)	Cubicle 72"			
		Senior Legal Research Officer	100	Cubicle 84"			
		Legal Researcher	100	Cubicle 72"			
		Filing Space	80	Filing Area			
	Sub Total		1095				
16	Information Technology	Head of ITC	150	Office (Full height)	Enclosed space with access control entry		
		IT Manager	120	Office (Full height)			
		Records Management Officer	100	Cubicle 72" - each			
		Records Management Technicians	3*(100)	Workstation 54"			
		Records Management Clerks	2*(100)	Workstation 54"			
		Information Analyst	100	Cubicle 72" - each			
		Database Analyst	100	Cubicle 72" - each			
		Solutions Analyst	100	Cubicle 72" - each			
		Information Technology Administrator	100	Cubicle 72" - each			

Trinidad and Tobago Gambling Control Commission							
Space Requirements 2023							
#	Division	Officer/Office	Required Space (Sq. Ft.)	Type of Work Area	Details	Comments	
		Information Technology Officers	3*(100)	Cubicle 72" - each			
		Network Engineer	100	Cubicle 72" - each			
		Workstation	2*(100)	Countertop			
		Filing Space	2*(80)	Filing Area			
		Sub Total	2030				
18	Accounts Department	Accounts Manager	120	Office (Full height)			
		Accountant	2*(100)	Cubicle 84"			
		Accounting Clerk II	100	Workstation 54"			
		Cashiers	5*(100)	Workstation 54"			
		Payroll Accounts Clerk	100	Workstation 54"			
	Audit	Internal Audit Manager	120	Office (Full height)			
		Internal Auditors	3*(100)	Cubicle 72"			
	Tax	Tax Manager	120	Office (Full height)			
		Tax Analyst	3*(100)	Cubicle 72"			
		Filing Space	80	Filing Area			
		Sub Total	1940				
8	Procurement	Procurement Manager	120	Office (Full height)			
		Administrative Assistant	100	Workstation 54"			
		Senior Procurement Officer	100	Cubicle 84"			
		Procurement Officer	3*(100)	Cubicle 72" - each			
		Stores and Inventory Officer	100	Cubicle 72" - each			
		Contracts Officer	100	Cubicle 72" - each			
		Filing Space	80	Filing Area			
		Sub Total	900				
	Other Facilities						
	Records Centre		250	Enclosed room	Special equipment for files		
	Multi-purpose/childcare		1000	Enclosed room	Gym, child care/		
	Sick bay		100	Enclosed room	3 patients max occupancy		
	Conference/ Meeting Room		2*(700)	Enclosed room	Sound proof , AV capacity, Scalable/ 35 max occupancy		
	Library		400	Enclosed room	Access controlled		
	Strong Room		100	Enclosed room	Access controlled		

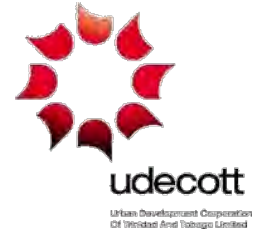
Trinidad and Tobago Gambling Control Commission							
Space Requirements 2023							
#	Division	Officer/Office	Required Space (Sq. Ft.)	Type of Work Area	Details	Comments	
	Storage (Misc./ Vault)		400	Enclosed room	Access controlled		
	Storage (IT/ Data Centre/ Monitoring Room / CCTV Room / Transactions Monitoring Room)		4*(200)	Enclosed room	Access controlled		
	IT Seminar Room		400	Enclosed room	Access controlled / 15 persons max occupancy		
	Meeting Room 1st floor		500	Enclosed room	25 persons max occupancy - Licensing Hearings		
	Meeting Room 2nd floor		500	Enclosed room	25 persons max occupancy - Licensing Hearings		
	Copy Centre 1st floor		2*(100)	Workstation 54"	Sound proof, Heavy Duty Copier/shredder, binding machines, counter top workspace		
	Copy Centre 2nd floor		2*(100)	Workstation 54"	Sound proof, Heavy Duty Copier/shredder, binding machines, counter top workspace		
	Copy Centre 3rd floor		2*(100)	Workstation 54"	Sound proof, Heavy Duty Copier/shredder, binding machines, counter top workspace		
	General access area		300		General Public Area		
	Lunchroom/cafeteria		1000				
	Kitchenette		4*(150)				
	Security Post		80		Area / workstation to be designated for posting of security officers on each floor		
	Custodial Post/ Hospitality		2*(80)		Area/workstation to be designated for posting of custodian officers.		
	Male/Female washrooms to have disabled access toilets				lockers, changing rooms in each male and female areas.		
	Sub Total		8,390				
86	Total		19,770				



GAMBLING (GAMING & BETTING) CONTROL COMMISSION (GCC) CORPORATE OFFICE

76-78 ST VINCENT STREET
CONCEPTUAL DESIGN 05.02.24

PROJECT OVERVIEW

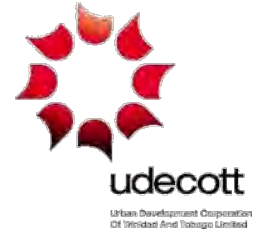


- Client: The Gambling (Gaming & Betting) Control Commission of Trinidad & Tobago (GCC)
- Location: 76-78 St.Vincent Street, Port of Spain

Development Overview:

- In 2022 instruments of appointment were presented to the first Board of the Gambling (Gaming and Betting) Control Commission
- The commission was put in place as part of the regulatory framework to address concerns arising out of private member clubs providing casino-style games to their membership.
- In the operationalization of the commission they have been allocated four (4) properties across Trinidad and Tobago in order to effectively perform their mandate.
- The subject of this proposal is a property located at **76-78 St. Vincent St., Port of Spain** which has been designated as the “**Corporate Office**” for the GCC; thus the **GCC is seeking to execute construction and outfitting works on said property to support its functions.**

PROJECT PROPOSAL



In order to meet the functional needs of the client construction and outfitting works outlined, but not limited to those described below, are required on the St. Vincent Street property:

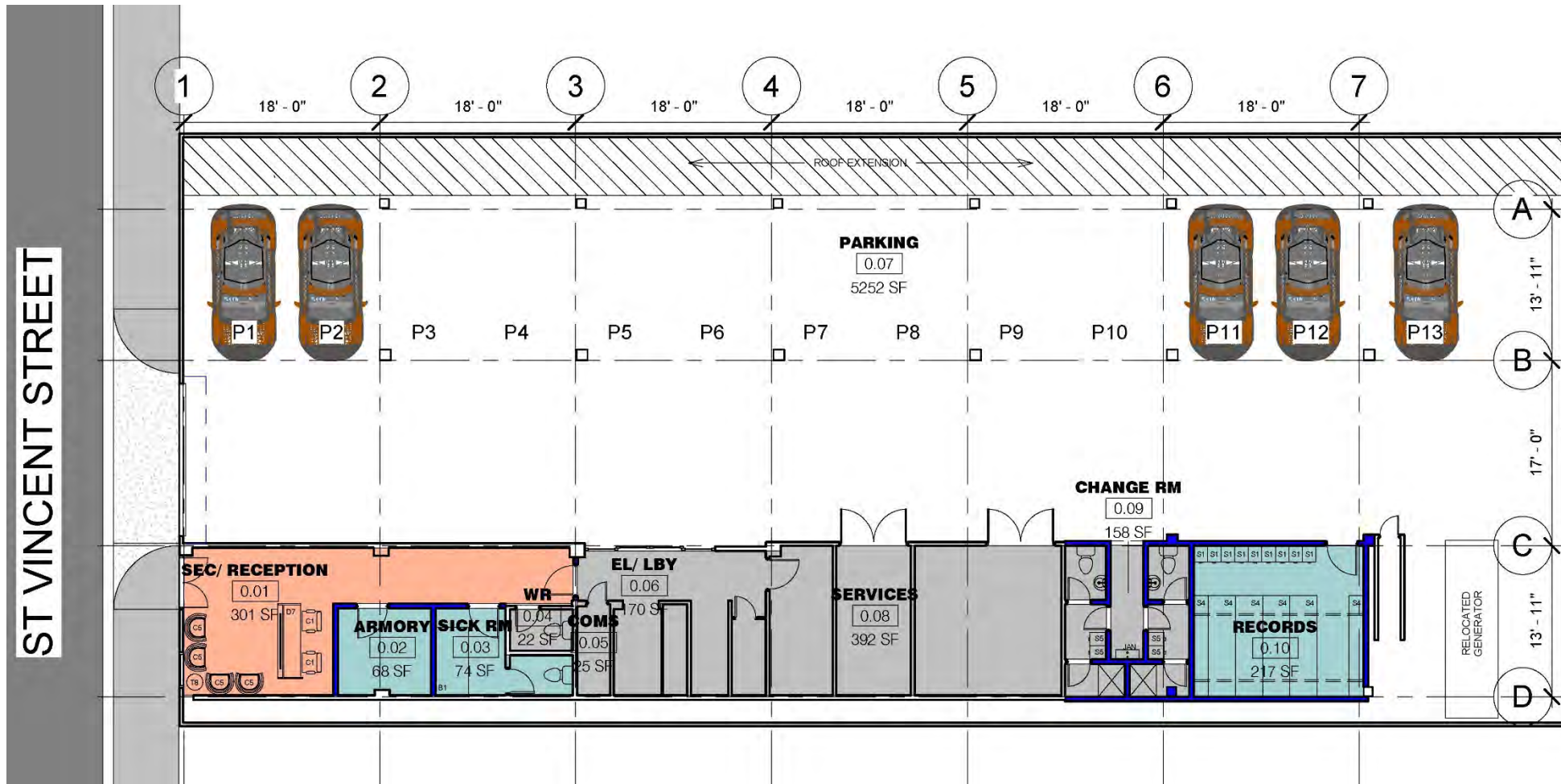
1. Construction of interior partition walls & doors inclusive of glazing in private offices, meeting spaces, amenity spaces & walls subdividing departments
2. Modifications to existing ceilings to meet new layouts & as required for MEP retrofits
3. Supply and installation of furniture & furnishings
4. Supply and installation of floor & wall finishes as required for functionality inclusive of carpet tiles, luxury vinyl tiles, porcelain tile, gym flooring, roof tiles etc
5. Painting & Decorating inclusive of the provision of artwork
6. MEP, HVAC, ICT & Security installations and retrofits to meet the spatial and functional requirements of the client
7. Inclusion of wheelchair accessible washrooms
8. Supply and installation of signage (internal & external inclusive of room signage)
9. Supply and installation of cladding on the exterior of the building
10. Roofing works inclusive of making good concrete roof & extension of roof to rear of ground floor parking.
11. External works & landscaping

LOCATION



The building is located at 76-78 St. Vincent Street in “downtown” Port of Spain - it is on the section of St Vincent Street bounded on the North by Oxford Street & in the South by Park Street

SITE/ GROUND FLOOR PLAN



OPEN OFFICE

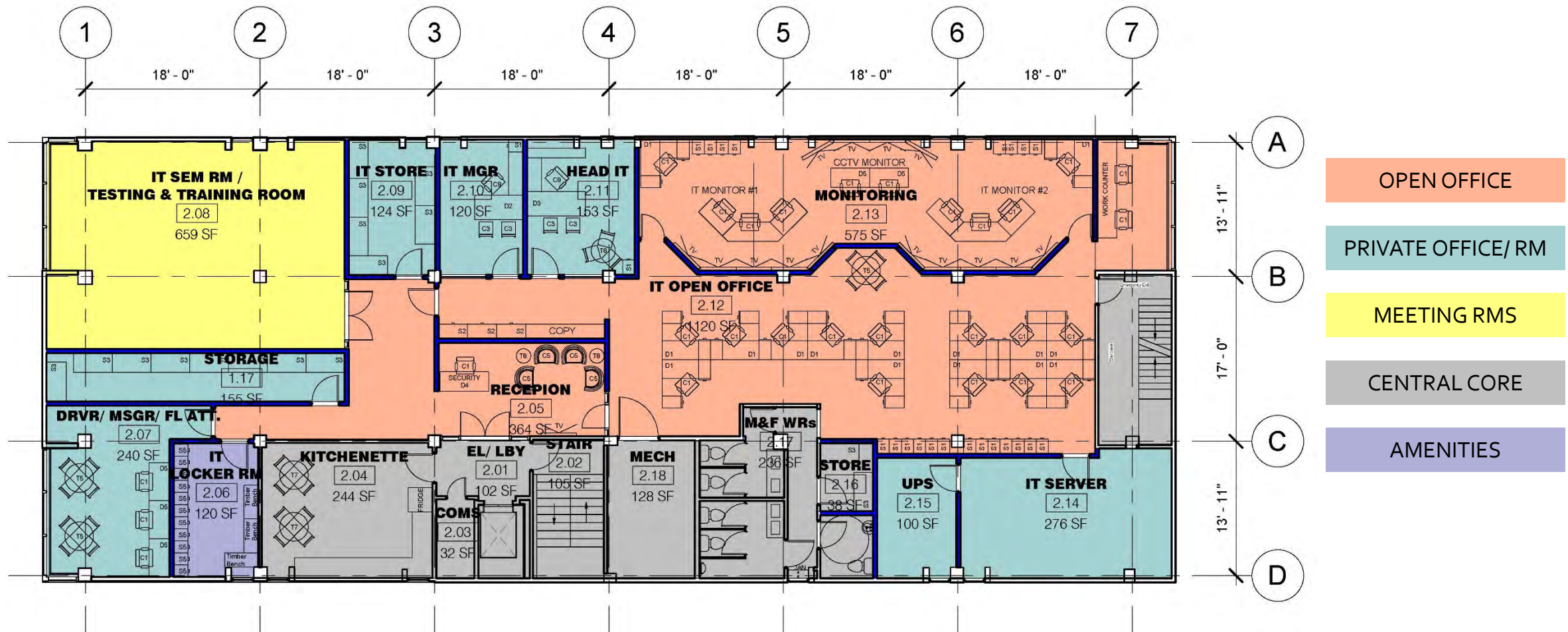
PRIVATE OFFICE/ RM

CENTRAL CORE

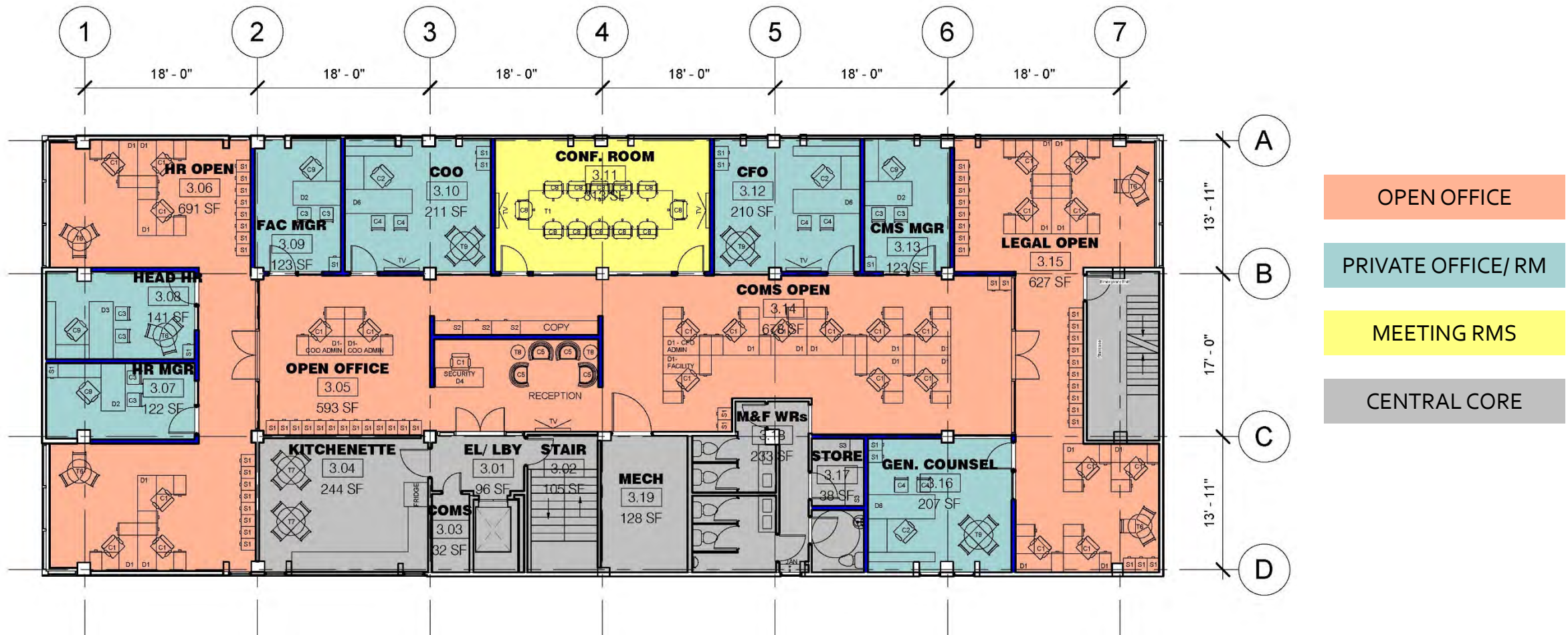
1st FLOOR LAYOUT



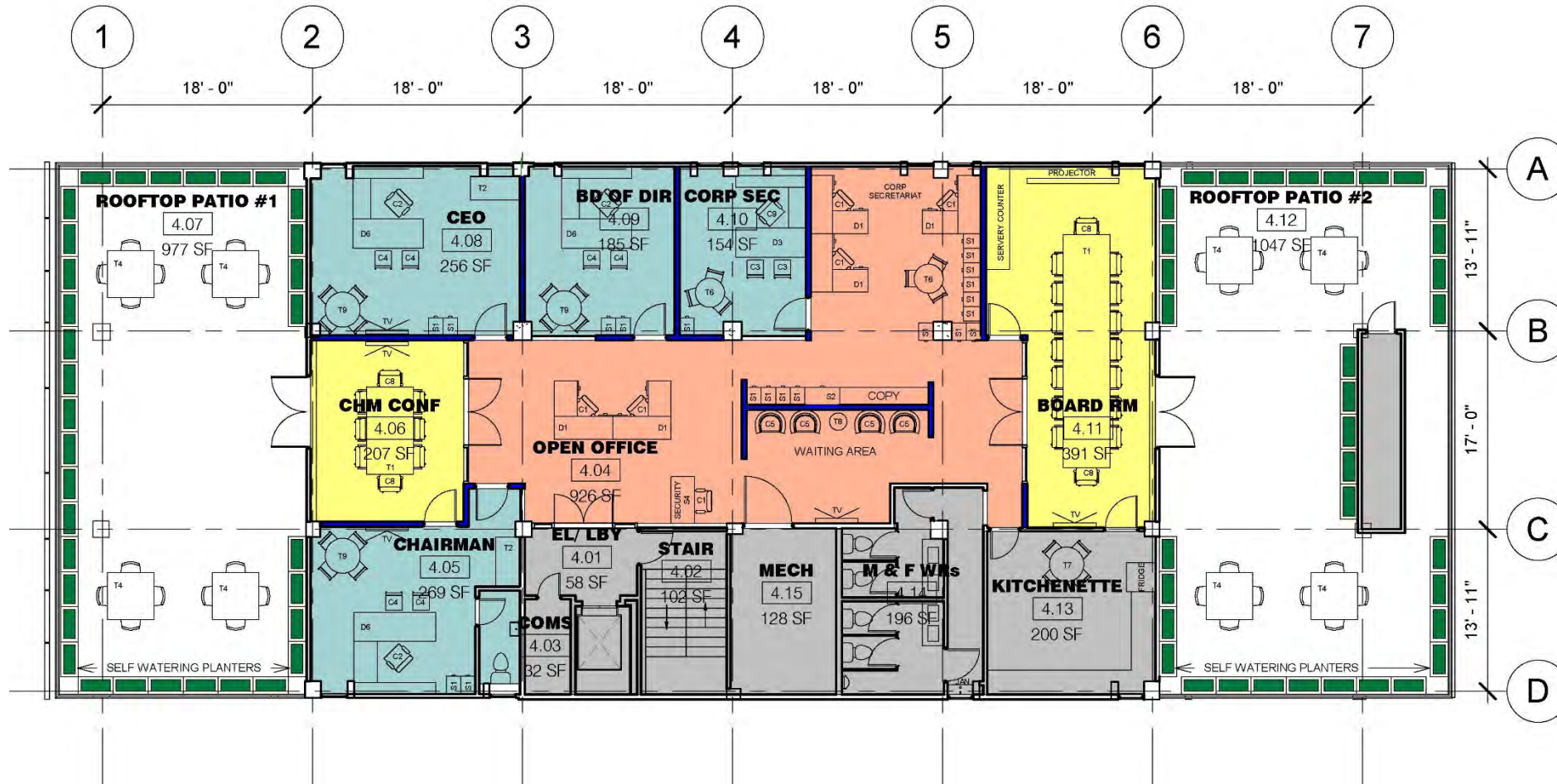
2nd FLOOR LAYOUT



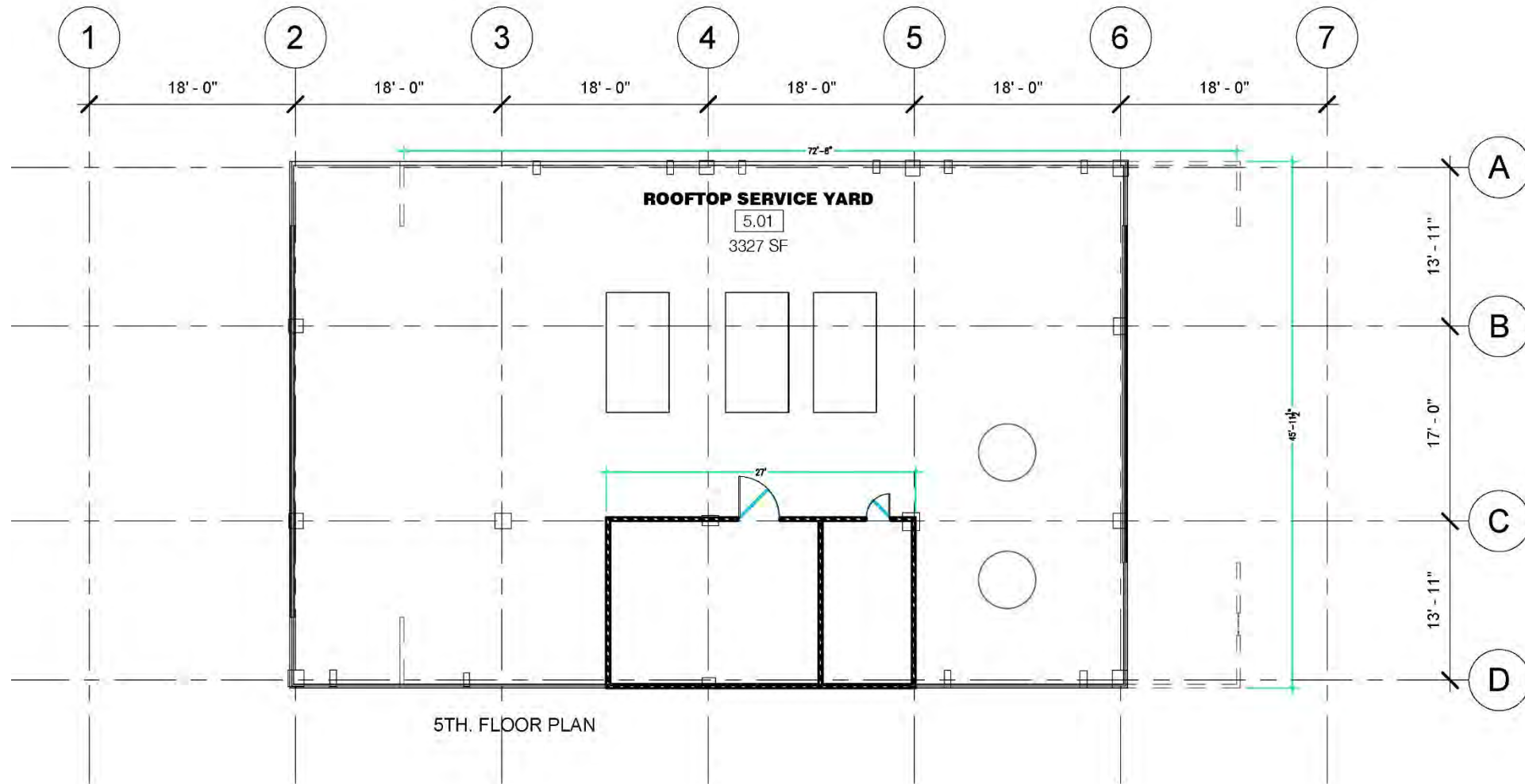
3rd FLOOR LAYOUT



4th FLOOR LAYOUT



ROOF PLAN



CONCEPTUAL IMAGES – 4th FLOOR OPEN OFFICE AREA



CONCEPTUAL IMAGES – 4th FLOOR CONFERENCE ROOM



CONCEPTUAL IMAGES – 3rd FLOOR OPEN OFFICE AREA



CONCEPTUAL IMAGES – 1st FL. ACCOUNTS AREA



EXAMPLE IMAGES OF FURNITURE TYPES

D1 – Cubicle



D2 – L shaped desk



D3 – U shaped desk



D4 – Security/ Reception Desk



D5 – Benching Desk



D6 – U shaped desk Executive



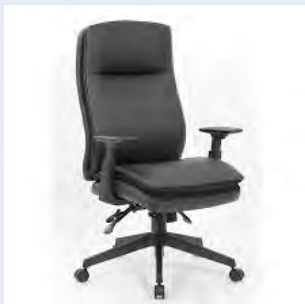
D7 – 2 person reception desk



C1 – Task chair



C2 – Executive task chair



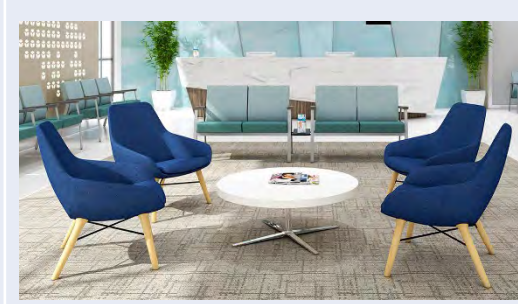
C3 – Guest chair



C4 – Executive guest chair



C5 – Reception chairs



EXAMPLE IMAGES OF FURNITURE TYPES

C6 – Gang visitor's chair



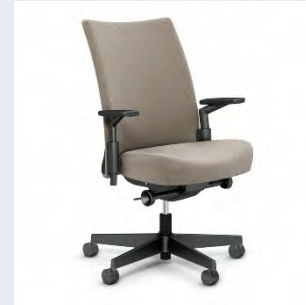
C7 – Nesting chair



C8 – Conference room chairs



C9 – Manager's task chair



T1 – Conference table



T2 – Tea station



T3 – Folding Table



T4 – Outdoor table & chairs



T5 – Meeting table w 4 chairs



T6 – Meeting table w 3 chairs



T7 – Kitchen table w 4 chairs



T8 – Coffee table



EXAMPLE IMAGES OF FURNITURE TYPES

T9 – Exec meeting table w chair



S1 – Filing Cabinets



S2 – Storage cabinets



S3 – Storage shelves



S4 – Mobile Filing



S5 – Lockers



B1 – Sick room bed



Self watering planter box



Monitoring room furniture



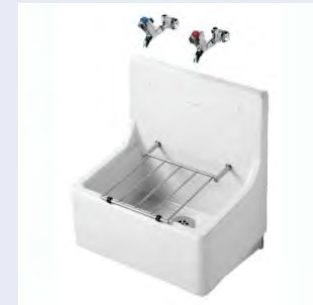
Blinds



Refrigerator



Janitor's sink



NEXT STEPS

- Obtain cabinet approval & funding
- Issue RFP for Design-Build services
- Award contract & Implement the works



PERFORMANCE SPECIFICATIONS FOR THE REFURBISHMENT & OUTFITTING WORKS AT GAMBLING CONTROL COMMISSION (GCC) ST VINCENT ST.

ARCHITECTURAL UNIT, THE URBAN DEVELOPMENT CORPORATION OF
TRINIDAD & TOBAGO (UDECOTT)

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SECTION 101 - PRELIMINARIES

1.0 PRELIMINARY PARTICULARS

1.01 Names of parties

The Employer is: The Urban Development Corporation of Trinidad and Tobago
38-40 Sackville Street
Port of Spain
Phone: 225-4004

The Project Manager is: The Urban Development Corporation of Trinidad and Tobago
38-40 Sackville Street
Port of Spain
Phone: 225-4004

User Client is: The Gambling Control Commission of Trinidad & Tobago (GCC)
#25 Western Main Road
St James
Trinidad & Tobago
235-4GCC (4422)

1.02 Description of the Works

Development Overview:

In 2022 instruments of appointment were presented to the first Board of the Gambling (Gaming and Betting) Control Commission

The commission was put in place to as part of the regulatory framework to address concerns arising out of private member clubs providing casino-style games their membership.

In the operationalization of the commission, they have been allocated four (4) properties across Trinidad and Tobago in order to effectively perform their mandate.

The subject of this proposal is a property located at 76-78 St. Vincent St., Port of Spain, which has been designated as the “Corporate Office” for the GCC; thus, the GCC is seeking to execute construction and outfitting works on said property to support its functions.

1.03 Location of the site

76-78 St.Vincent Street, Port of Spain

2.0 CONTRACT PARTICULARS

2.01 Form of Contract

The Articles of Agreement and Conditions of Contract will be those of:

Contract for Plant and Design-Build First Edition 1999 published by the *Fédération Internationale des Ingénieurs-Conseils* (FIDIC)

3.0 DESIGN REQUIREMENTS

An office building must have flexible and technologically-advanced working environments that are safe, healthy, comfortable, durable, aesthetically-pleasing, and accessible. It must be able to accommodate the specific space and equipment needs of the User. As such the Contractor shall prepare and submit a Design which meets the following Employer's requirements:

3.01 Roles and Responsibilities of the Designer

- The Contractor shall assume full responsibility for the professional quality, completeness, accuracy and co-ordination of all design documents and its conformance with all applicable laws, rules, regulations and orders governing said work.
- The Designers shall consider the scale and character of the surrounding urban fabric in designing above ground structures.
- The Designers shall consider sustainable initiatives including but not limited to the following:

Water Efficiency: Water Greywater system (recycled rainwater) for flushing fixtures

Energy Efficiency: Computerized building management system optimizes energy use by mechanical and electrical systems., Solar Energy use within the building to cut energy costs, Use of natural daylighting to reduces lighting energy cost

Material Selection: Regional materials used throughout design: concrete, landscape materials, finishes, etc. Use of interior finishes made from recycled materials

Indoor Environmental /Air Quality: Low-emission materials—paints, coatings, adhesives, sealants and floorings are used throughout to maximize indoor air quality.

- All design documents (including drawings, plans, schedules, equipment manuals etc.) shall describe with specificity all elements, details, components, materials, and other information necessary for the complete construction of the Works and the delivery of the Works fully functional and operational for its intended purposes, including compliance/satisfaction of all testing, permitting, qualifications, certifications, validations, and obtaining regulatory certification and approvals by all applicable regulatory authorities required to render the Project and all its components operational and functionally and legally usable for their intended purpose.
- The Contractor shall perform all Design Services described in, contemplated by, inferable from, or necessary or desirable to achieve the objectives specifically stated in the Scope of Works and in the Employer's requirements and the Contract, including all Design Services necessary for the Project to be properly constructed by the Contractor in accordance with all applicable guidelines, requirements and standards. In development of the designs, the Contractor must give careful and adequate consideration to ensure that the designs which are prepared are efficient, cost effective, safe, functional, constructible and that the final product is easily maintained and at minimal cost.
- The Contractor shall prepare, as necessary, surveys and topographic information including photographs needed to establish line and grade of services lines, location of property lines and easements and to determine the necessary earthworks (cut and fill) to design and construct all structures.
- All design and construction documents shall be prepared using the English (metric) system, unless otherwise specified in the Contract.
- Design services shall be performed by licensed design professionals. The standard of care for architectural and engineering services performed shall be the highest degree of care and skill used by design professionals practicing under the same time and locality conditions.

3.02 Design Review Process

The Contractor shall provide for all quality control design reviews required by sound professional architectural and engineering practices.

The Employer's final review and approval of design documents will be carried out at the following sequential stages of design development:

Stage 1 – (25%) Completion of Preliminary Architectural and Engineering designs and drawings including outline Technical Specifications (Materials and Workmanship)

Stage 2 – (35%) Completion of Final Architectural and Engineering designs and drawings

Stage 3 – (75%) Completion of Design Development Architectural and Engineering designs, drawings, details and schedules (Floor Finishes, Wall Finishes, Paint Colour/Scheme, Ironmongery, Doors, Windows, etc.), including Bar Bending Schedules for all reinforced concrete design; fabrication/shop drawings for structural steel work; equipment cut-sheets, fittings and fixtures cut-sheets.

Stage 4 – (95%) Completion of “For Construction” Drawings and Detailed Technical Specifications

Stage 5 – (100%) Completion of “As-built drawings”

The documents for the above stages shall be submitted to the Employer for approval only after completion of design reviews by the Contractor and completion of the design quality checks and certifications by the Contractor's Quality Team. Any review or approval by the Employer shall not relieve the Contractor of or otherwise diminish its obligations under the Contract.

The Contractor shall conduct presentations (Microsoft PowerPoint or approved) on the Conceptual architectural design options, recommended preferred options and design criteria. The presentations are to be delivered to Employer representatives and other stakeholders to provide precise and clear understanding/appreciation of the conceptual designs and also to solicit comments from the audience. The Contractor may also be requested to conduct similar presentations at the various design review stages

3.03 Design Review Notices

The Contractor shall give written notice of scheduled Design Reviews to the Employer in accordance with the terms and conditions of the Contract.

The purpose of Design Reviews is to examine different aspects of the design, but not limited to:

- Ensure technical integrity by verifying that the design complies with all contract requirements; design standards, codes of practice and governmental regulations
- Ensure maintainability of the designs
- Ensure the constructability of the designs
- Ensure that the designs are consistent with the Contractors Price Proposal with respect to the cost of construction works
- Ensure that there is compatibility amongst all designs
- In the case of reviews of “For Construction Drawings”, to enable construction to commence and/or continue
- The Employer's Approval will be required prior to proceeding to each succeeding Stage.
- The design notes and computation sheets shall be fully titled, numbered, dated, indexed, and signed by the lead designer and the checker.
- All drawings shall be dated and initialled by the lead designer and checker
- All Engineering drawings shall be stamped and signed by a Board of Engineering of Trinidad and Tobago (BOETT) registered Engineer of Record.
- All Architectural drawings shall be stamped and signed by a Board of Architecture of Trinidad and Tobago (BOATT) registered Architect of Record.

4.0 Proposed Code and Standards

The proposed codes and standards to be used in the designs include the following:

4.01 Architectural Designs

PLANNING	<ul style="list-style-type: none"> • Town and Country Planning Regulations • Regional Corporation Regulations
BUILDINGS/ STRUCTURES	<ul style="list-style-type: none"> • International Building Code (IBC) 2018. • Caribbean Uniform Building Code (CUBIC) • AWPB U1 – User Specification for Treated Wood: 2012 • American Society of Civil Engineers code ASCE-7-05 • International Building Code (IBC) for earthquake loading using equivalent static analysis and compared to CUBIC. A peak ground acceleration of 0.4g shall be used. • American National Standards Institute (ANSI) • American Concrete Institute ACI 318 • American Institute of Steel Construction (AISC manuals) • ASHRAE Standard 189.1
LIFE SAFETY	<ul style="list-style-type: none"> • NFPA 101-2015 – Life Safety Code • NFPA 1-2015 – Fire Code
UNIVERSAL ACCESSIBILITY	<ul style="list-style-type: none"> • Accessible and Usable Buildings and Facilities ANSI A117.1:2014
SUSTAINABILITY	<ul style="list-style-type: none"> • LEED v4 Guidelines
LOCAL REGULATIONS	<ul style="list-style-type: none"> • GORTT Office Outfitting Policy • The Occupational Safety and Health Act 1, 2004 as amended 2006

4.02 Structural Designs

VERTICAL LOADS	<ul style="list-style-type: none"> • American Society of Civil Engineers (ASCE): ASCE 7-05 Minimum Design Loads for Buildings and Other Structure
EARTHQUAKE LOADS	<ul style="list-style-type: none"> • ASCE 7-05 and International Building Code (IBC) 2009 - (Refer to Seismic Research Unit website http://www.uwiseismic.com/Maps.aspx for Hazard Maps of Trinidad and Tobago -2475 year Return Period)

PERFORMANCE SPECIFICATIONS

WIND LOADS	<ul style="list-style-type: none"> ASCE 7-05 (Trinidad 117mph, Tobago 130mph – 3 sec. Gust for Trinidad and Tobago)
REINFORCED CONCRETE	<ul style="list-style-type: none"> American Concrete Institute (ACI): ACI 318-08 or latest Building Code Requirements for Structural Concrete
STRUCTURAL STEEL	<ul style="list-style-type: none"> American Institute of Steel Construction (AISC): Manual of Steel Construction (Load & Resistance Factor Design), Specification for Structural Steel Buildings (AISC 360-10), AISC 341 – 10 including Supplement No. 1 dated 2006 (Seismic Provisions for Structural Steel Buildings AISC 358 - 10 including Supplement No. 1 dated 2009 (Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications
STRUCTURAL MASONRY	<ul style="list-style-type: none"> ACI 530-05 / ASCE 5-05 / TMS 402-02
STEEL REINFORCEMENT	<ul style="list-style-type: none"> ASTM A615 GR 60 – $F_y = 60$ ksi, $F_u = 75$ ksi
STRUCTURAL STEEL MATERIAL:	<ul style="list-style-type: none"> ASTM A992 – $F_y = 50$ ksi (Wide Flange and Hot Rolled Sections) ASTM A36 – $F_y = 36$ ksi (Plates)
OTHER STANDARDS	<ul style="list-style-type: none"> ASTM – American Society for Testing and Materials
IMPORTANT NOTE:	<ul style="list-style-type: none"> The structural designs should comply to the Ministry of Works and Infrastructure Latest Structural Design Guidelines for Trinidad & Tobago All structural drawings should be stamped and signed with a registered Civil / Structural Engineer's Board of Engineers' stamp of T&T. All designs must be accompanied by structural design calculations which must include the following: <ul style="list-style-type: none"> Design Data Sheet Design Methodology Sheet with assumptions made in the modelling of the structure. Drawing of the complete mathematical model used in the structural (manual or computer) analysis. Clear input and output data. An electronic copy of the computer structural model.

**LOCAL
REGULATIONS**

- Trinidad and Tobago Standard - Recommendations for the Design of Building – TTS 16 90 400 (1978)
- National Building Code of Trinidad & Tobago
- BAPE WIND CODE (1981)
- Wind Speed Maps for the Caribbean for Application with the Wind Load Provisions of ASCE 7 shall be used to determine reference velocities as defined in ASCE 7.

4.03 Roadway, Road Pavement Designs

AASHTO Codes (American Association of State Highway and Transportation Officials)

4.04 Mechanical, Electrical & Plumbing Engineering Design Requirements

The planned service life of the Design shall be 30 years. The planned service life of all mechanical, electrical and electronic equipment shall be 15 years. The planned service lives shall take into account the maintenance requirements of the relevant materials and equipment. Equipment that is sourced must have local providers to supply replacements when the need arises. All designs for Mechanical, Electrical and Plumbing Systems must conform with the following proposed codes and standards:

ELECTRICAL

- ANSI C37.13 – 2015 Standard for Low-Voltage AC Power Circuit Breakers Used In Enclosures
- ANSI C37.14 - 2015 Standard for DC (3200 V and below) Power Circuit Breakers Used in Enclosures
- ANSI C57.12.00 – 2010 Standard for General Requirements For Liquid-Immersed Distribution, Power, And Regulating Transformers
- ANSI C57.12.01 – 2015 Standard for General Requirements For Dry-Type Distribution And Power Transformers
- ANSI C63.12 – 2015 Standard Recommended Practice For Electromagnetic Compatibility Limits And Test Levels
- ANSI C80.1 - 2015 Electrical Rigid Steel Conduit
- ANSI C80.3 - 2015 Electrical Metallic Tubing - Steel (EMT-S)

- ANSI C80.6 - 2018 Electrical Intermediate Metal Conduit

HVAC

- ASHRAE Handbook—HVAC Applications, 2019
- ASHRAE Handbook—HVAC Systems and Equipment, 2020
- ASHRAE 55 – 2017 Thermal Environmental Conditions for Human Occupancy
- ASHRAE 62.1 - 2019 Ventilation for Acceptable Indoor Air Quality
- ASHRAE 90.1 - 2019 Energy Standard for Buildings except Low-Rise Residential Buildings
- ASHRAE Standard 90.4 - 2019 Energy Standard for Data Centers
- ASHRAE Standard 185.1 - 2020 Method of Testing UV-C Lights for Use in Air-Handling Units or Air Ducts to Inactivate Airborne Microorganisms
- ASHRAE Standard 202-2018 Commissioning Process for Buildings and Systems
- ASHRAE 2020 Smart Grid Application Guide: Integrating Facilities With The Electric Grid
- ASME A17.1 / CSA B44 – 2019 Safety Code for Elevators and Escalators

PLUMBING

- ASME B31 – Standards of Pressure Piping
- ASME B31.3 – 2020 Process Piping
- ASME B31.8 - 2018 Gas Transmission and Distribution Piping Systems
- ASME B31.9 – 20120 Building Services Piping
- ASME B31.12 - 2019 Standard on Hydrogen Piping and Pipelines
- ICC IFC 2021 International Fire Code
- ICC IPC 2021 International Plumbing Code
- ICC IMC 2021 International Mechanical Code
- ICC IFGC 2021 International Fuel Gas Code

- ICC IECC 2021 International Energy Conservation Code
- ICC IPSPDC 2021 International Private Sewerage Disposal Code
- ICC ISPSC 2021 International Swimming Pool and Spa Code
- ASME B16 – Standards of Pipes and Fittings
- ICEA Class H Flexible Cables
- IEEE 730 Software QA Plans
- IEEE 830 Recommended Practice for Software Requirements Specifications
- NFPA 10 – 2018 Standards on Portable Fire Extinguishers
- NFPA 13 – 2019 Standard for the Installation of Sprinkler System
- NFPA 14 - 2019 Standard for the Installation of Standpipes and Hose Systems
- NFPA 15 – 2022 Standard water spray fixed systems for fire protection
- NFPA 17 – 2021 Standard for Dry Chemical Extinguishing Systems
- NFPA 17A – 2021 Standard for Wet Chemical Extinguishing Systems
- NFPA 20 – 2019 Standard for the Installation of Stationary Pumps for Fire Protection
- NFPA 22 – 2018 Standard for Water Tanks for Private Fire Protection
- NFPA 24 – 2022 Standard for the Installation of Private Fire Service Mains and Their Appurtenances
- NFPA 45 – 2019 Standard on Fire Protection for Laboratories Using Chemicals

LIFE SAFETY

- NFPA 54 – 2021 National Fuel Gas Code
- NFPA 58 – 2020 Liquefied Petroleum Gas Code
- NFPA 59 – 2021 Utility LP-Gas Plant Code

- NFPA 59A – 2019 Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG)
- NFPA 70 – 2020 National Electric Code
- NFPA 72 – 2019 National Fire Alarm and Signalling Code
- NFPA 75 – 2020 Standard for the Fire Protection of Information Technology Equipment
- NFPA 88A – 2019 Standard for Parking Structures
- NFPA 90A – 2021 Standard for the Installation of Air-Conditioning and Ventilating Systems
- NFPA 91 – 2020 Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids
- NFPA 92 – 2021 Standard for Smoke Control Systems
- NFPA 101 - 2021 Life Safety Code
- NFPA 110 – 2022 Standard for Emergency and Standby Power Systems
- NFPA 111 – 2022 Standard on Stored Electrical Energy Emergency and Standby Power Systems
- NFPA 418 – 2021 Standard for Heliports
- NFPA 780 – 2020 Standard for the Installation of Lightning Protection Systems
- NFPA 820 – 2020 Standard for Fire Protection in Wastewater Treatment and Collection Facilities
- NFPA 900 – 2019 Building Energy Code

LOCAL REGULATIONS

- Requirements of the OSH Authority in accordance with the OSH Act 2004 with amendments of 2006
- Requirements of the EMA of Trinidad and Tobago & Water Pollution Rules 2019
- Requirements of the Trinidad and Tobago Fire Service (TTFS), Ministry of National Security of Trinidad and Tobago
- Requirements of the Electrical Inspectorate Division, Ministry of Public Utilities of Trinidad and Tobago

- SMACNA HVAC Duct Construction Standards
- The National Plumbing Code of Trinidad and Tobago
- Trinidad & Tobago Electricity Commission Wiring for Light & Power 8th Edition
- Trinidad & Tobago Electrical Wiring Code Part 1 - Low Voltage Installations (TTS 171: Part 1: 2015)
- Trinidad & Tobago Electrical Wiring Code Part 2 - High Voltage Installations (TTS 171: Part 2: 2002)
- Trinidad & Tobago Electrical Wiring Code Part 3 – Renewable Energy Systems and Interconnection Requirements (TTS 171: Part 3: 2011)
- Workplace Design – Lighting of Indoor work places – Specification (TTS 611-2008)
- Water and Sewerage Authority Guidelines for Design and Construction of Water and Wastewater Systems in Trinidad and Tobago

4.05 Statutory Requirements

All designs shall be prepared in accordance with and in compliance with the guidelines, regulations and statutory and legal requirements of all Governmental Statutory and Regulatory Agencies and other service providers which include:

1. Town & Country Planning Division (TCPD)
2. Water and Sewerage Authority (WASA)
3. Trinidad and Tobago Electricity Commission (T&TEC)
4. Local Health Authorities
5. Ministry of Works and Transport (Drainage Division, Highways Division)
6. Division, Traffic Management Branch and other applicable Divisions
7. Regional Corporations
8. Trinidad and Tobago Fire Services
9. Environmental Management Authority (EMA)
10. Telecommunications Services of Trinidad and Tobago (TSTT)

SECTION 102 – DESIGN PROCEDURES & VALIDATION REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for design of the facility, based on the design criteria specified.
- B. Validation requirements.

1.02 DEFINITIONS

- A. Validation: All forms of evidence that are used to predict whether the design will comply with the requirements or to verify that the construction based on the design actually does comply. During Preliminary Design, Design Development, and Construction Documents, requirements to submit Validation are primarily intended to forestall use of designs or constructions that will not comply. At any time before completion of construction, Validation is presumed to be only a prediction and may subsequently be invalidated by actual results. The term Validation is used to distinguish these forms of evidence from traditional submittals commonly required during the construction phase.
- B. Proven-In-Use: Proven to comply by having actually been built to the same or very similar design with the same materials as proposed and functioning as specified.
- C. Proven-by-Mock-Up: Compliance reasonably predictable by having been tested in full-scale mock-up using the same materials and design as proposed and functioning as specified. Testing need not have been accomplished specifically for this project; when published listings of independent agencies include details of testing and results, citation of test by listing number is sufficient (submittal of all test details is not required).

1.03 REFERENCE STANDARDS

- A. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2013c.

1.04 SUBMITTALS

- A. Validation Submittal Procedures:
 - 1. Time Frames: As specified. If there is a conflict between the degree of detail or completion specified and the progress of the design or construction, obtain a clarification before submitting.
 - 2. Recipient: Employer's Engineer.
 - 3. Number of Copies: 2 copies for Employer's use and records; Employer will return not more than one additional copy.
 - 4. For time periods that constitute Milestones, all Validation submittals required during that period must be complete and accepted before the Milestone can be considered achieved.
 - 5. Resubmissions: Clearly identified as such, with all changes made since the original submittal clearly marked.

1.05 QUALITY ASSURANCE

A. Qualifications of Testing/Inspection Agencies Performing Validation:

1. Qualified and equipped to perform applicable tests/inspection.
2. Regularly engaged in testing and inspection activities on a commercial basis.
3. Authorized to operate in the State in which the project is located.
4. Validation: Submittal of qualifications, based on ASTM E329.

PART 2 PRODUCTS

2.01 DESIGN-BUILDER FURNISHED PRODUCTS

A. In addition to requirements specified in other sections, provide products and elements that comply with the following.

B. Elements Made Up of More Than One Product:

1. Where an element is specified by performance criteria, use construction either proven in use or proven-by-mock-up, unless otherwise indicated.
 - a. The Design-Builder may choose whether to use elements proven-in-use or proven-by-mock-up, unless either option is indicated as specifically required.
 - b. Where test methods accompany performance requirements, use those test methods to test the mock-up.
2. Where a type of product is specified, without performance criteria specifically applicable to the element, use the type of product specified.
 1. Where more than one type of product is specified, without performance criteria specifically applicable to the element, use one of the types of products specified.
 2. Where a type of product is specified, with applicable performance criteria, use either the type of product specified or another type of product that meets the performance criteria as proven-in-use or proven-by-mock-up.
 3. Where more than one type of product is specified, with applicable performance criteria, use either one of the types of products specified or another type of product that meets the performance criteria as proven-in-use or proven-by-mock-up.
 4. Where neither types of products nor performance criteria are specified, use products that will perform well within the specified life span of the building.

C. Products:

1. Where a product is specified only by a manufacturer name and model number/brand name, use only that model/brand product.

PERFORMANCE SPECIFICATIONS

2. Where the properties of a product are specified by description and/or with performance criteria, use products that comply with the description and/or performance criteria.
 3. Where manufacturers are listed for a particular product, use a product made by one of those manufacturers that also complies with other requirements.
- D. Reference Standards: Where products or workmanship is specified by reference to a document not included in the Contract Documents, comply with the requirements of the document, except where more stringent requirements are specified.
1. Date of Issue: As indicated in each instance except where a specific date is established by code.

PART 3 EXECUTION

3.01 DESIGN

- A. During Preliminary Design, the design criteria and the design itself must be refined, finalized, and documented.
- B. Employer will appoint representatives of the following departments to provide details of functional needs:
1. User groups.
 2. Operations staff.
 3. Maintenance staff.
- C. Design Documentation: Record all design and performance criteria that will be of use during occupancy and operation of the project, including all items specified for maintenance manuals, below.
1. Design Criteria Documentation Included in Construction Documents: Organized logically (from the point of view of operations staff) and placed in a prominent location in drawing sets.
 2. If desired, documentation may consist of annotated modifications to and amplification of the Conceptual Documents, with changes that affect Contract Times or Contract Price documented as required for modifications.
 3. If required, shop drawings may be used to accomplish design documentation.
 4. Employer will maintain the project program document, modified to reflect changes made during refinement of the design.
 5. Drawings: Prepared using AutoCAD R14, using Employer's specified drawing and layering conventions.
 6. Shop Drawings: Prepared using same CAD software.
 7. Mock-Ups: Where necessary to clarify design intent and obtain approvals, construct full scale mock-ups.

3.02 PROGRESS DOCUMENTATION

- A. Progress Schedule: As specified in the Conditions of the Contract.

3.03 PERFORMANCE OF VALIDATION

- A. In addition to the requirements stated in other sections, provide the following Validation of compliance at each stage of the project:
1. If a Validation requirement is specified without an indication of when it is to be submitted, submit or execute it before the end of Construction Documents.
- B. Proven-In-Use: Where elements proven-in-use are used to comply with performance requirements:
1. In the Proposal, identify which elements will be accomplished using proven-in-use elements.
 2. During Design Development, identify proven-in-use elements proposed for use, including building name, location, date of construction, owner contact, and description of design and materials in sufficient detail to enable reproduction in this project.
- C. Proven-By-Mock-Up: Where elements proven-by-mock-up are used to comply with performance requirements:
1. In the Proposal, identify which elements will be accomplished using proven-by-mock-up elements.
 2. During Design Development, identify proven-by-mock-up elements proposed for use, with test report including date and location of test, name of testing agency, and description of test and mock-up.
 3. Mock-up testing need not have been performed specifically for this project, provided the mock-up is substantially similar in design and construction to the element proposed.
- D. Design Analyses (including Engineering Calculations):
1. Where a design analysis or calculation is specified without identifying a particular method, perform analysis in accordance with accepted engineering or scientific principles to show compliance with specified requirements, and submit report that includes analysis methods used and the name and qualifications of the designer.
 2. Where engineering design is allowed to be completed after commencement of construction, Validation may be in the form of shop drawings or other data.
 3. Submit design analyses at the end of Design Development unless otherwise indicated.
 4. Where design analysis is specified to be performed by licensed design professional, use a design professional licensed in Trinidad and Tobago.
- E. Validation for Products:
1. Where actual brand name products are not identified by either the Employer or the Design-Builder, identify the products to be used.

2. In the Proposal:
 - a. Identify one or more product types for each system, assembly, or element.
 - b. For each product type, provide brief descriptive or performance specifications.
 - c. For major manufactured products that are commonly purchased by brand name, and any other products so indicated, identify at least one manufacturer that will be used.
 3. During Preliminary Design or Design Development:
 - a. Where more than one product type is identified for a particular system, assembly, or element, identify exactly which type will be used.
 - b. For each product type, provide descriptive or performance specifications; early submittals may be brief specifications, but complete specifications are required prior to completion of construction documents.
 - c. For each product type, identify at least one manufacturer that will be used.
 - d. For major manufactured products that are commonly purchased by brand name, and any other products so indicated, provide manufacturer's product literature on at least one actual brand name product that meets the specifications, including performance data and sample warranty.
 4. During Construction:
 - a. Identify actual brand name products used for every product, except commodity products specified by performance or description.
 - b. Where a product is specified by performance requirements with test methods, and if so specified, provide test reports showing compliance.
 - c. Provide manufacturer's product literature for each brand name product.
 - d. Provide the manufacturer's certification that the product used on the project complies with the contract documents.
 5. Before End of Closeout:
 - a. Provide copies of all manufacturer warranties that extend for more than one year after completion.
- F. Regardless of whether Validation is specified or not, the actual construction must comply with the specified requirements and may, at the Employer's discretion, be examined, inspected, or tested to determine compliance.
1. Validation submittals will not be approved or accepted, except to the extent that they are part of documents required to be approved or accepted in order to proceed to the next stage of design or construction. However, approval or acceptance of Validation will not constitute approval or acceptance of deviations from the specified requirements unless those deviations are specifically identified as such on the submittal.

- ### 3.04 FIELD TESTING AND INSPECTION AS VALIDATION

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SECTION 103 – TRAINING

PART 1 GENERAL

1.01 SUMMARY

1.01 SUBMITTALS

A. See RFP Documentation and FIDIC Contract for submittal procedures; except:

1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Team.
2. Submit one copy to the Commissioning Team, not to be returned.
3. Make commissioning submittals on time schedule specified by Commissioning Team.
4. Submittals indicated as "Draft" are intended for the use of the Commissioning Team in preparation of overall Training Plan; submit in editable electronic format, Microsoft Word 2003 preferred.
5. When the following are specified in individual sections, submit them at project closeout:
 - Project record documents.
 - Operation and maintenance data
 - Warranties
 - Bonds
 - Other types as indicated

1.02 QUALITY ASSURANCE

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
1. Provide as instructors the most qualified trainer of those Design Build Contractors and/or installers who actually supplied and installed the systems and equipment.
 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.
 3. All training sessions are to be video recorded in a professional manner with the edited recordings submitted.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

SECTION 104 – HANDOVER DOCUMENTATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

- A. RFP Documentation and FIDIC Contract - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 2370 – Handover Documentation
- C. Individual Product Sections: Specific requirements for operation and maintenance data.
- D. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to FIDIC Engineer ____.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. FIDIC Engineer will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Employer, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with FIDIC Engineer comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Employer's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Addenda.
3. Change Orders and other modifications to the Contract.

B. Ensure entries are complete and accurate, enabling future reference by Employer.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Record Drawings: Legibly mark each item to record actual construction including:

1. Field changes of dimension and detail.
2. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of SubDesign Build Contractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants where required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Employer's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 216 by 280 mm three D side ring binders with durable plastic covers; 50 mm maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Engineer, Consultants, Design Build Contractor and subDesign Build Contractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible SubDesign Build Contractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Employer's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

SECTION 105 – COMMISSIONING

PART 1 GENERAL

1.01 SUMMARY

- A. Commissioning is intended to achieve the following specific objectives; this section specifies the Design Build Contractor's responsibilities for commissioning:
 - 1. Verify that the work is installed in accordance with the Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Pre-functional Checklists executed by Design Build Contractor are utilized to achieve this.
 - 2. Verify and document that functional performance is in accordance with the Contract Documents: Functional Tests executed by Design Build Contractor and witnessed by the Commissioning Team/Team are utilized to achieve this.
 - 3. Verify that operation and maintenance manuals submitted to Employer are complete: Detailed operation and maintenance (O&M) data submittals by Design Build Contractor are utilized to achieve this.
 - 4. Verify that the Employer's operating personnel are adequately trained: Formal training conducted by Design Build Contractor is utilized to achieve this.
- B. Commissioning, including Functional Tests, O&M documentation review, and training, is to occur after startup and initial checkout and be completed before Handover
- C. The Commissioning Team directs and coordinates all commissioning activities; this section describes some but not all of the Commissioning Team's responsibilities.

1.02 SCOPE OF COMMISSIONING

- A. The following are to be commissioned:
- B. Plumbing Systems:
- C. HVAC System, including:
 - 1. Piping systems and equipment.
 - 2. Ductwork and accessories.
 - 3. AHU, VAV and Terminal units.
 - 4. Control system.
 - 5. Sound control devices.
- D. Exhaust and Ventilation:

PERFORMANCE SPECIFICATIONS

1. Exhaust, Ventilation and Specialty fans.
- E. Electrical Systems:
1. Uninterruptible power systems.
 2. Emergency Generator and associated systems.
 3. Grounding Systems
- F. Electronic Safety and Security:
1. Security system, including doors and hardware.
 2. Fire and smoke alarms.
- G. Communications:
1. Voice and data systems.
 2. Public address/paging.
- H. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.
- I. Indoor Air Quality Procedures: The Commissioning Team/Team will coordinate; Design Build Contractor will plan and execute.

1.03 RELATED REQUIREMENTS

- A. RFP Documents and FIDIC Contract Requirements
- B. Section 2360 – Training
- C. Section 2370 – Handover Documentation

1.04 REFERENCE STANDARDS

- A. ASHRAE & CISBE- Sample Forms for Pre-functional Checklists and Functional Performance Tests;
- B. Equipment Manufacturer's Forms for Pre-functional Checklists and Functional Performance Tests.

1.05 SUBMITTALS

- A. See RFP Documentation and FIDIC Contract for submittal procedures; except:
1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Team, unless they require review by FIDC Engineer; in that case, submit to Engineer first.
 3. Submit one copy to the Commissioning Team/Team, not to be returned.
 4. Make commissioning submittals on time schedule specified by Commissioning Team.
 5. Submittals indicated as "Draft" are intended for the use of the Commissioning Team in preparation of Pre-functional Checklists or Functional Test requirements; submit in editable electronic format, Microsoft Word preferred.
 6. As soon as possible after submittals made to Engineer are approved, submit copy of approved submittal to the Commissioning Team.
- B. Manufacturers' Instructions: Submit copies of all manufacturer-provided instructions that are shipped with the equipment as soon as the equipment is delivered.
- C. Product Data: If submittals to Engineer do not include the following, submit copies as soon as possible:
1. Manufacturer's product data, cut sheets, and shop drawings.
 2. Manufacturer's installation instructions.
 3. Startup, operating, and troubleshooting procedures.
 4. Fan and pump curves.
 5. Factory test reports.
 6. Warranty information, including details of Employer's responsibilities in regard to keeping warranties in force.
- D. Startup Plans and Reports.
- E. Completed Pre-functional Checklists.

PART 2 PRODUCTS

2.01 TEST EQUIPMENT

- A. Provide all standard testing equipment required to perform startup and initial checkout and required Functional Testing; unless otherwise noted such testing equipment will NOT become the property of Employer.
- B. Calibration Tolerances: Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply:
 - 1. Temperature Sensors and Digital Thermometers: Certified calibration within past year to accuracy of 0.3 degree C and resolution of plus/minus 0.05 degree C.
 - 2. Pressure Sensors: Accuracy of plus/minus two percent of the value range being measured (not full range of meter), calibrated within the last year.
 - 3. Calibration: According to the manufacturer's recommended intervals and when dropped or damaged; affix calibration tags or keep certificates readily available for inspection.
- C. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Employer; such equipment, tools, and instruments are to become the property of Employer.
- D. Dataloggers: Independent equipment and software for monitoring flows, currents, status, pressures, etc. of equipment.
 - 1. Dataloggers required to for Functional Tests will be provided by the Design Build Contractor and will not become the property of Employer.

PART 3 EXECUTION

3.01 COMMISSIONING PLAN

- A. Commissioning Team has prepared the Commissioning Plan.
 - 1. Attend meetings called by the Commissioning Team Lead for purposes of completing the commissioning plan.
 - 2. Require attendance and participation of relevant subDesign Build Contractors, installers, suppliers, and manufacturer representatives.
- B. Design Build Contractor is responsible for compliance with the Commissioning Plan.
- C. Commissioning Plan: The commissioning schedule, procedures, and coordination requirements for all parties in the commissioning process.
- D. Basis of Design Documentation (BOD): Detailed documentation of the functional requirements of the project; descriptions of the systems, components, and methods chosen to meet the design

intent; assumptions underlying the design intent.

1. Basis of Design Documentation is to be prepared by the Design Build Contractor.

E. Commissioning Schedule:

1. Submit anticipated dates of startup of each item of equipment and system to Commissioning Team within 60 days after award of Contract.
2. Re-submit anticipated startup dates monthly, but not less than 4 weeks prior to startup.
3. Pre-functional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.
4. Provide sufficient notice to Commissioning Team for delivery of relevant Checklists and Functional Test procedures, to avoid delay.

3.02 STARTUP PLANS AND REPORTS

- A. Startup Plans: For each item of equipment and system for which the manufacturer provides a startup plan, submit the plan not less than 8 weeks prior to startup.
- B. Startup Reports: For each item of equipment and system for which the manufacturer provides a startup checklist (or startup plan or field checkout sheet), document compliance by submitting the completed startup checklist prior to startup, signed and dated by responsible entity.
- C. Submit directly to the Commissioning Team.

3.03 PRE-FUNCTIONAL CHECKLISTS

- A. A Pre-functional Checklist is required to be filled out for each item of equipment or other assembly specified to be commissioned.
1. No sampling of identical or near-identical items is allowed.
 2. These checklists do not replace manufacturers' recommended startup checklists, regardless of apparent redundancy.
 3. Pre-functional Checklist forms will not be complete until after award of the contract; the following types of information will be gathered via the completed Checklist forms:
 - a. Certification by installing Design Build Contractor that the unit is properly installed, started up, and operating and ready for Functional Testing.
 - b. Confirmation of receipt of each shop drawing and commissioning submittal specified, itemized by unit.
 - c. Manufacturer, model number, and relevant capacity information; list information "as specified," "as submitted," and "as installed."

- d. Serial number of installed unit.
 - e. List of inspections to be conducted to document proper installation prior to startup and Functional Testing; these will be primarily static inspections and procedures; for equipment and systems may include normal manufacturer's start-up checklist items and minor testing.
 - f. Sensor and actuator calibration information.
 4. ____ preliminary Pre-functional Checklists are included in the contract documents; the Commissioning Team has the authority to modify these and will furnish final versions as applicable.
- B. Design Build Contractor is responsible for creating and filling out Pre-functional Checklists, after completion of installation and before startup; witnessing by the Commissioning Team is not required unless otherwise specified.
 1. Each line item without deficiency is to be witnessed, initialed, and dated by the actual witness; checklists are not complete until all line items are initialed and dated complete without deficiencies.
 2. Checklists with incomplete items may be submitted for approval provided the Design Build Contractor attests that incomplete items do not preclude the performance of safe and reliable Functional Testing; re-submission of the Checklist is required upon completion of remaining items.
 3. Individual Checklists may contain line items that are the responsibility of more than one installer; Design Build Contractor shall assign responsibility to appropriate installers or subcontractors, Design Build Contractors, with identification recorded on the form.
 4. If any Checklist line item is not relevant, record reasons on the form.
 5. Design Build Contractor may independently perform startup inspections and/or tests, at his option.
 6. Regardless of these reporting requirements, Design Build Contractor is responsible for correct startup and operation.
 7. Submit completed Checklists to Commissioning Team within two days of completion.
- C. The Design Build Contractor is responsible for furnishing the Pre-functional Checklists to Commissioning Team
 1. Initial Drafts: Design Build Contractor is responsible for initial draft of Pre-functional Checklist where so indicated in the Contract Documents.
 2. Provide all additional information requested by Commissioning Team to aid in preparation of checklists, such as shop drawing submittals, manufacturers' startup checklists, and O&M data.
 3. Commissioning Team may add any relevant items deemed necessary regardless of whether they are explicitly mentioned in the Contract Documents or not.

PERFORMANCE SPECIFICATIONS

4. When asked to review the proposed Checklists, do so in a timely manner.
- D. Commissioning Team Witnessing: Required for:
1. Each piece of primary equipment, unless sampling of multiple similar units is allowed by the commissioning plan.
 2. A sampling of non-primary equipment, as allowed by the commissioning plan.
- E. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Employer.
1. If difficulty in correction would delay progress, report deficiency to the Commissioning Team immediately.

3.04 FUNCTIONAL TESTS

- A. A Functional Test is required for each item of equipment, system, or other assembly specified to be commissioned, unless sampling of multiple identical or near-identical units is allowed by the final test procedures.
- B. Design Build Contractor is responsible for execution of required Functional Tests, after completion of Pre-functional Checklist and before closeout.
- C. Commissioning Team is responsible for witnessing and verifying results of Functional Tests. The Design Build Contractor is responsible for the preparation and completion of forms for that purpose.
- D. Design Build Contractor is responsible for correction of deficiencies and re-testing at no extra cost to Employer; if a deficiency is not corrected and re-tested immediately, the Commissioning Team will document the deficiency and the Design Build Contractor's stated intentions regarding correction.
1. Deficiencies are any condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents or does not perform properly.
 2. When the deficiency has been corrected, the Design Build Contractor completes the form certifying that the item is ready to be re-tested and returns the form to the Commissioning Team; the Commissioning Team will reschedule the test and the Design Build Contractor shall re-test.
 3. Identical or Near-Identical Items: If ten percent, or three, whichever is greater, of identical or near-identical items fail to perform due to material or manufacturing defect, all items will be considered defective; provide a proposal for correction within two weeks after notification of defect, including provision for testing sample installations prior to replacement of all items.
 4. Design Build Contractor shall bear the cost of Employer and Commissioning Team personnel time witnessing re-testing.
 5. Design Build Contractor shall bear the cost of Employer and Commissioning Team personnel time witnessing re-testing if the test failed due to failure to execute the relevant Pre-

functional Checklist correctly; if the test failed for reasons that would not have been identified in the Pre-functional Checklist process, Design Build Contractor shall bear the cost of the second and subsequent re-tests.

E. Functional Test Procedures:

1. Some test procedures maybe included in the Contract Documents; where Functional Test procedures are not included in the Contract Documents, test procedures will be determined by the Commissioning Team with input by and coordination with Design Build Contractor.

2. Examples of Functional Testing:

- a. Test the dynamic function and operation of equipment and systems (rather than just components) using manual (direct observation) or monitoring methods under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint).
- b. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc.
- c. Systems are run through all the HVAC control system's sequences of operation and components are verified to be responding as the sequence's state.
- d. Traditional air or water test and balancing (TAB) is not Functional Testing; spot checking of TAB by demonstration to the Commissioning Team is Functional Testing.

3. Some preliminary Functional Test procedures maybe included in the contract documents; the Commissioning Team has the authority to modify these and will furnish final versions as applicable.

F. Deferred Functional Tests: Some tests may need to be performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions; performance of these tests remains the Design Build Contractor's responsibility regardless of timing.

3.05 SENSOR AND ACTUATOR CALIBRATION

A. Calibrate all field-installed temperature, relative humidity, carbon monoxide, carbon dioxide, and pressure sensors and gages, and all actuators (dampers and valves) on this piece of equipment shall be calibrated. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.

B. Calibrate using the methods described below; alternate methods may be used, if approved by Employer beforehand. See PART 2 for test instrument requirements. Record methods used on the relevant Pre-functional Checklist or other suitable forms, documenting initial, intermediate and final results.

C. All Sensors:

1. Verify that sensor location is appropriate and away from potential causes of erratic operation.

2. Verify that sensors with shielded cable are grounded only at one end.
 3. For sensor pairs that are used to determine a temperature or pressure difference, for temperature make sure they are reading within 0.1 degree C of each other, and for pressure, within tolerance equal to two percent of the reading, of each other.
 4. Tolerances for critical applications may be tighter.
- D. Sensors Without Transmitters - Standard Application:
1. Make a reading with a calibrated test instrument within 150 mm of the site sensor.
 2. Verify that the sensor reading, via the permanent thermostat, gage or building automation system, is within the tolerances in the table below of the instrument-measured value.
 3. If not, install offset, calibrate or replace sensor.
- E. Sensors With Transmitters - Standard Application.
1. Disconnect sensor.
 2. Connect a signal generator in place of sensor.
 3. Connect ammeter in series between transmitter and building automation system control panel.
 4. Using manufacturer's resistance-temperature data, simulate minimum desired temperature.
 5. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter.
 6. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the building automation system.
 7. Record all values and recalibrate controller as necessary to conform with specified control ramps, reset schedules, proportional relationship, reset relationship and P/I reaction.
 8. Reconnect sensor.
 9. Make a reading with a calibrated test instrument within 150 mm of the site sensor.
 10. Verify that the sensor reading, via the permanent thermostat, gage or building automation system, is within the tolerances in the table below of the instrument-measured value.
 11. If not, replace sensor and repeat.
 12. For pressure sensors, perform a similar process with a suitable signal generator.
- F. Sensor Tolerances for Standard Applications: Plus/minus the following maximums:
1. Watthour, Voltage, Amperage: one percent of design.
 2. Pressure, Air, Water, Gas: three percent of design.
 3. Air Temperatures (Outside Air, Space Air, Duct Air): 0.2 degree C.

PERFORMANCE SPECIFICATIONS

4. Relative Humidity: four percent of design.
 5. Barometric Pressure: 340 Pa.
 6. Flow Rate, Air: ten percent of design.
 7. Flow Rate, Water: four percent of design.
 8. AHU Wet Bulb and Dew Point: 1.1 degrees C.
- G. Critical Applications: For some applications more rigorous calibration techniques may be required for selected sensors. Describe any such methods used on an attached sheet.
- H. Valve/Damper Stroke Setup and Check:
1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
 2. Set pump/fan to normal operating mode.
 3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
 4. Command valve/damper to open; verify position is full open and adjust output signal as required.
 5. Command valve/damper to a few intermediate positions.
 6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).
- I. Isolation Valve or System Valve Leak Check: For valves not associated with coils.
1. With full pressure in the system, command valve closed.
 2. Use an ultra-sonic flow meter to detect flow or leakage.

3.06 TEST PROCEDURES - GENERAL

- A. Provide skilled technicians to execute starting of equipment and to execute the Functional Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.
- B. Provide all necessary materials and system modifications required to produce the flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to their pre-test condition.
- C. Sampling: Where Functional Testing of fewer than the total number of multiple identical or near identical items is explicitly permitted, perform sampling as follows:
 1. Identical Units: Defined as units with same application and sequence of operation; only minor size or capacity difference.
 2. Sampling is not allowed for:
 - a. Major equipment.
 - b. Life-safety-critical equipment.
 - c. Pre-functional Checklist execution.
 3. XX = the percent of the group of identical equipment to be included in each sample; defined for specific type of equipment.
 4. YY = the percent of the sample that if failed will require another sample to be tested; defined for specific type of equipment.
 5. Randomly test at least XX percent of each group of identical equipment, but not less than three units. This constitutes the "first sample."
 6. If YY percent of the units in the first sample fail, test another XX percent of the remaining identical units.
 7. If YY percent of the units in the second sample fail, test all remaining identical units.
 8. If frequent failures occur, resulting in more troubleshooting than testing, the Commissioning Team may stop the testing and require Design Build Contractor to perform and document a checkout of the remaining units prior to continuing testing.
- D. Manual Testing: Use hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").
- E. Simulating Conditions: Artificially create the necessary condition for the purpose of testing the response of a system; for example apply hot air to a space sensor using a hair dryer to see the response in a VAV box.
- F. Simulating Signals: Disconnect the sensor and use a signal generator to send an amperage, resistance or pressure to the transducer and control system to simulate the sensor value.

PERFORMANCE SPECIFICATIONS

- G. Over-Writing Values: Change the sensor value known to the control system in the control system to see the response of the system; for example, change the outside air temperature value from 50 degrees F to 75 degrees F to verify economizer operation.
- H. Indirect Indicators: Remote indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100 percent closed, are considered indirect indicators.
- I. Monitoring: Record parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of the relevant control systems; where monitoring of specific points is called for in Functional Test Procedures:
 - 1. All points that are monitored by the relevant control system shall be trended by Design Build Contractor; at the Commissioning Team's request, Design Build Contractor shall trend up to 20 percent more points than specified at no extra charge.
 - 2. Other points will be monitored by the Commissioning Team using dataloggers.
 - 3. At the option of the Commissioning Team, some control system monitoring may be replaced with datalogger monitoring.
 - 4. Provide hard copies of monitored data in columnar format with time down left column and at least 5 columns of point values on same page.
 - 5. Graphical output is desirable and is required for all output if the system can produce it.
 - 6. Monitoring may be used to augment manual testing.

3.07 OPERATION AND MAINTENANCE MANUALS

- A. See Section 2370 Handover Documentation for additional requirements.
- B. Add design intent documentation furnished by Engineer to manuals prior to submission to Employer.
- C. Submit manuals related to items that were commissioned to Commissioning Team for review; make changes recommended by Commissioning Team.
- D. Commissioning Team will add commissioning records to manuals after submission to Employer.

SECTION 204 – LANDSCAPING

1.0 GENERAL

1.01 DESCRIPTION

Work covers, in general terms: demolition, removals, site preparation and complete construction of the Project.

1.02 SCOPE

Landscape planting is inclusive but not limited to finished grading, supplying and spreading of soil, layout of plants and areas, seeding and sprigging of new lawns, ground cover plantings, shrub planting, tree planting, landscape edges.

1.03 PRODUCTS

All plants and turf material will conform to the varieties specified or shown in the Project Documentation and be true to the botanical name as listed in publications. 2) Substitutions shall only be made when a plant (or alternative as specified) is not obtainable and the Engineer authorizes a change order providing for use of the nearest equivalent obtainable.

1. **Plants:** shall be supplied from localities similar to the climatic conditions of the Project.

- a) Plants to be used in the Works shall be well branched and formed planting stock. They shall be sound, vigorous and free from disease, sunscald, windburn, abrasions, harmful insects or eggs, and have a normal healthy and non-broken root system.
- b) Symmetrically developed trees and shrubs shall be provided with uniform habit and shall be free from objectionable disfigurement.
- c) Groundcover and vines shall be provided with the number and length of runners for the size specified.
- d) Trees shall be earth balled and burlapped covered or pot grown.
- e) Shrubs, vines and ground cover plants shall be provided in well established in removable containers or formed homogenous soil sections.
- f) Palms shall have straight parallel sides and healthy stems that are not rotted, infected or eaten by pests or with root systems extending above the level which the palm was originally planted. Palms should have vigorous root system, a crown of new leaves, leaves the color of an adult palm and proper hardiness. Palms shall be balled and burlapped unless container grown palms are available. Off shoots are not acceptable.
- g) The minimum acceptable sizes of all plants measured before pruning in normal position shall conform to the measurements specified in the Project Documentation. Plants larger in size than specified may be used with the approval of the Engineer, at no extra cost.
- h) Container grown trees, shrubs, groundcover and vines shall have sufficient root growth to hold the earth intact when removed from the containers, but shall not be root bound. Containers shall be sufficiently rigid to hold ball shape and protect root mass during transporting.
- i) A plant schedule is to be provided listing the designated plants and following information:

- Botanical name
- Common name
- Size
- Condition
- Additional pertinent data

2. Soil :

Soil shall be free of foreign matter, toxic substances, weeds and any material or substance that may be harmful to plant growth. Material shall be stored in piles less than 1 meter high. Piles shall be protected from undue compaction and maintained free of contamination and construction debris. The soil shall comply with the following chemical criteria:

- a) PH value: between 5.5 and 7.2 for growing of grasses

3. Soil Conditioners:

- a. Peat shall be free from sticks, stones, roots, and other objectionable matter. It shall have a pH value of not less than 4 and nor more than 7.5. The minimum organic content shall be 85% on a dry weight basis. Peat shall be delivered in undamaged commercial bales in air dry condition.
- b. Manure shall be the decomposed animal manure of fully manure with minimum nitrogen, phosphoric acid and potassium percentage of 2-2-2 and a pH value of 6.0 to 7.5. Sludge waste product may be used as a substitute subject to approval of the Engineer. Manure and sludge shall be free of stones, sticks and non-bio-degradable material.
- c. Vermiculite shall be horticultural grade and free of any toxic material and conform to ASTM C516.
- d. Perlite shall conform to ASTM C 549.

4. **Planting Soil Mixture:** shall consist of approved soil, peat, manure and other soil conditioners as specified in the Project Documentation. The mixture shall be placed in accordance with the requirements of the trees, shrubs or grass to be planted and as per soil lab recommendation.

5. **Dry Plant Fertilizer:** shall be commercial grade and uniform in composition. Packets of slow release fertilizer shall bear the manufacturer's guaranteed statement of analysis. Control released fertilizer may be in packet or tablet form.

6. **Mulch:** shall be free of weeds, sticks and other deleterious material. Inert mulch material shall be crusher run rock, granite chips, marble chips or other suitable material approved by the Engineer. Organic mulch material shall be coco bean shell, shredded bark or other suitable material approved by the Engineer.

7. **Irrigation Water:** shall be provided from a source suitable for irrigation. Water shall be free from substances harmful to plant life. Water sources shall not exceed the following parameters:
 - a. PH: 6 to 7
 - b. Total dissolved solids: less than 1000 ppm

2.00 APPLICATION

Zones identified on the Site plan where grass or tree/ shrub plantings occur.

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology
3. Window schedule

3.02 QUALITY ASSURANCE

1. Landscape work must be undertaken by an experienced subcontractor specializing in landscape work. Work shall be performed and supervised at all times by qualified personnel.
2. All landscape materials shall be shipped with certificates of inspection as required by the Engineer. Manufacturer's certified analysis for standard packaged products shall be provided.
3. Defective plant material shall be considered to be any tree, shrub or plant which is:
 - a. Dead, dying or otherwise defective upon completion of the Works or six weeks after the first leafing out, whichever is later.
 - b. Not in accordance with the Project Documentation.
4. Job Conditions:
 - a. The Contractor shall proceed with and complete planting operations as rapidly as possible as portions of the Site become available, working within seasonal limitations for each type of landscape work required.
 - b. No planting shall be carried out during periods of heavy rain and heavy winds. When special conditions warrant a variance to the planting time and conditions, a proposed planting schedule shall be submitted to the Engineer for review and approval
 - c. Planting of trees and shrubs will occur prior to lawn plantings.
5. Transportation of plants: Prior to transporting, all plants shall be inspected, dug, and made ready for transit in accordance with standard practices and procedures. The Engineer shall be notified of the delivery schedule in advance so the plant material may be inspected upon arrival at the Site. All unacceptable plant material shall be removed from the Site immediately. The Engineer may request inspection at the source of the plants prior to delivery to the Site. The Engineer reserves the right to reject any plant material that does not meet the quality requirements of the Project Documentation. The Contractor shall protect plants to prevent damage to the root balls, containers or desiccation of leaves. Care shall be taken to avoid injury to the plants. Material shall not be dropped from vehicles. Balled and burlapped plants shall be handled carefully to avoid cracking or breaking the earth ball. Container grown plants shall be handled by the container. Plants shall not be handled by the trunk or stem.
6. Fertilizer, pesticides, fungicides, chemicals and seed shall be delivered to the Site in the original unopened containers bearing the manufacturer's guaranteed chemical analysis, name, trade name, or trademark. In lieu of containers, fertilizers and seed may be furnished in bulk and a certificate indicating the above information shall accompany each delivery. The fertilizer shall be kept dry and protected from contamination.

7. Storage:

- a. Plants shall be installed as soon as possible after delivery to the Site. Plant material shall be protected from exposure to wind and direct sunlight prior to installation. Plants not installed on the day of arrival shall be stored in shaded areas, protected from the wind and maintained and watered to good horticultural standards until planted. Care shall be taken to ensure that the plants do not dry out.
- b. Root balled and container grown trees and plants shall be placed close together with root balls covered with approved soil, peat or straw and kept medium moist until planted.
- c. Seed and fertilizers shall be kept in dry storage away from contaminants in areas as designated or approved by the Engineer.
- d. Soil, compost, fertilizers and other amendments shall be delivered to the Site and stored separately in approved locations and in a manner to avoid contamination and wetting until soil mixing operations commence.
- e. Fertilizers, antidessicants, pesticides and other chemicals shall be delivered to the Site in the manufacturer's unopened containers, each fully labelled, conforming to applicable regulations and bearing the trade name and warranty of the producer.

8. Site Preparation:

- a. The Contractor shall examine areas to receive landscaping for compliance with requirements and conditions affecting performance of work in this Section. The Contractor shall not proceed with plant operations until unsatisfactory conditions are discussed with the Engineer and corrected.
- b. The Contractor shall determine the location of above grade and underground utilities and perform work in a manner which will avoid damage to them. Damage to underground utilities shall be repaired at the Contractor's expense.
- c. When conditions detrimental to plant growth are encountered, such as rubble, adverse drainage or obstructions, the Contractor shall notify the Engineer prior to planting.
- d. When grades are encountered that are detrimental to finished grading and planting operations, the Contractor shall notify the Engineer prior to planting.
- e. Sub-Surface Grading
 - All perennial weeds shall be treated with an approved herbicide and the period of time recommended by the manufacturer shall be allowed to elapse prior to commencing grading operations.
 - Grading operations shall occur when the sub-soil is reasonably dry and workable.
 - Areas to be graded shall be graded to smooth flowing contours with all minor hollows and ridges removed. Rock projections and boulders shall be removed and disposed of at a location as agreed with the Engineer.
 - Non-cohesive, light subsoil shall be loosened with a 3-tine ripper to a depth of 300 mm at 600 mm centers. Stiff clay and other cohesive subsoil shall be loosened with a single tine ripper to a depth of 450 mm at 1 m centers.
 - A minimum of 150 mm of approved soil shall be spread uniformly over the loosened area and incorporated into the sub-grade soil to obtain a uniform and well pulverized soil mix.
 - The area shall be compacted to a minimum of 90 % of maximum dry density as determined in accordance with Test 13 of BS 1377. 1.4.3 Finished Grading. Grades shall be brought to the finished ground levels as indicated on the Project Drawings or as agreed with the

Engineer to a tolerance of ± 25 mm. finished ground levels shall be 30 mm below adjoining paving or kerbs after compaction and settlement.

- Grading shall be carried out in such a manner that even gradients are formed between the spot levels indicated on the Project Drawings. No depressions shall remain which could collect standing water

9. Planting Operations and Layout:

- a. Plant material locations and planting bed outlines shall be staked two (2) days before any excavations are made. The Contractor shall notify the Engineer two (2) days before the start of planting operations. Plant locations may be adjusted by the Engineer to meet site conditions.
- b. Protection of Existing Vegetation :
 - Grassed areas that have been established prior to planting operations shall be covered before any excavations are made in a manner that will afford adequate protection.
 - Existing shrubs, trees and groundcover shall be barricaded in a manner to protect them during planting operations.
 - Plant pits shall be dug to produce vertical sides and flat incompact bottoms. Excavated material shall be disposed of in a proper manner. If approved by the Engineer, excavated material may be used as fill in areas where fill material is required. Upon completion of excavation, the pit shall be filled with water and then left to thoroughly drain prior to setting plants.

10. Backfill Mixture: Backfilling around plant shall be completed in 150 mm layers after water has drained away.

11. Guys and Stakes: plants shall be guyed or staked as required.

- a. Trees 1.2 to 1.8 m tall shall be held in place with one (1) bracing stake. The stake shall be positioned close to the tree on the windward side. The stake shall be driven vertically into firm ground taking care not to injure the roots. The tree shall be held firmly to the stake with a double strand of wire. A chafing guard shall be used where the wire is in contact with the tree.
- b. Trees 1.8 to 2.5 m tall shall be held in place with two (2) bracing stakes placed on opposite sides. The stake shall be driven vertically into firm ground taking care not to injure the roots. The tree shall be held firmly in place with a double strand of wire. Chafing guards shall be used where the wire is in contact with the tree.
- c. Trees taller than 2.5 m shall be held firmly in place with three (3) guying lines of double strand wire placed equidistantly around the tree. The wire shall be anchored with ground stakes driven into firm ground outside the earth saucer. The wire shall be anchored to the tree at a point equal or greater than one half of its height. A flag shall be securely fastened to each guying wire.

12. Ancillaries To Planting :

- a. Edging Plant Beds - Planting beds shall be uniformly edged, using a sharp tool to provide a clear cut division line between the planted area and adjacent area and to provide the required shape. The entire planted area shall be raked smooth while retaining the earth saucers. Edging materials shall be installed in accordance with the manufacturer's instructions.
- b. Mulch shall be spread to a uniform depth of 100 mm no later than 48 hours after planting. Mulch should be kept out of lawn areas, crowns of shrubs and off paved areas and buildings.
- c. Watering of Plants -The Contractor shall water the plants as necessary to maintain an adequate supply of moisture within the root zone and maintain healthy growth. The water shall be allowed to flow gently around the plant and shall not be delivered to cause disturbance to the roots or soil. Run-off, puddling and wilting shall be prevented. Earth saucers shall be rebuilt as needed to retain water.

PERFORMANCE SPECIFICATIONS

- d. Pruning - Immediately after planting, all plants are to be pruned as directed by the Engineer and in accordance with accepted horticultural practices. The total amount of foliage shall be pruned by one fourth to one third on the installed trees and shrubs to compensate for loss of roots and transporting shock.
- e. Antidesiccant Application 1) Plants requiring additional protection against wilt and shock shall be sprayed with antidesiccant in accordance with the manufacturer's instructions.

3.03 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement as applicable.
2. Clean Up and Site Restoration: Excess and waste material shall be removed daily. Pavements and work areas shall be kept in a clean and orderly fashion. Pedestrian access points and vehicular access points shall be maintained and kept clear at all times. All rubbish and litter shall be cleared as it accumulates within the landscape work area.
3. Application Of Pesticide :
 - a. When pesticide becomes necessary to remove a disease or pest, a trained and certified operative shall apply the required pesticide in accordance with the recommendations of the manufacturer.
 - b. Hydraulic equipment shall be provided for liquid application of pesticides with a leak proof tank, positive agitation methods, controlled application pressure and metering gauges.
 - c. Prior to application the Contractor shall submit a pesticide treatment plan to the Engineer.

4.00 REFERENCED STANDARDS

1. ASTM C 516 Specifications for Vermiculite Loose Fill Thermal Insulation
2. ASTM C 549 Specification for Perlite Loose Fill Insulation

5.00 DURABILITY

Newly installed landscaping shall be maintained in a healthy growing condition. Maintenance operations shall begin immediately after each plant is installed and shall continue a week until being handed over to the Engineer.

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. When installing shrubs and trees, landscaping should have a warranty of 6 months, with care from the landscape installer.
2. Irrigation systems (if installed) should have a workmanship warranty of two years and a product warranty of 5 years.

SECTION 301- SITE SURVEY

1.0 GENERAL

1.01 DESCRIPTION

Site Surveys shall be detailed studies that verify or supplement site information or site appraisals that have been provided by the client or by Consultant teams on behalf of the client/Employer. The level of detail of Site Survey should directly correspond to project complexity. The Contractor may commission specialist consultants or agencies to carry out specific aspects of the site survey as determined and approved by the Client after initial feasibility studies.

1.02 SCOPE

Site Surveys may include one or multiple of the following:

1. Existing buildings (including valuation, measured surveys, structural surveys, structural investigations, condition surveys, and demolition surveys).
2. Geological and geotechnical Surveys
3. Topographical surveys
4. Environmental Surveys, including : Contamination, Ecological, Climatological, Flood inundation , air quality and Soil surveys
5. Traffic and transport.
6. Acoustic.
7. Photographic.
8. Historic use.
9. Boundary surveys.
10. Structural surveys (including retained structures, underground structures and obstructions).
11. Hazardous Materials surveys
12. Fire Life Safety Surveys/Reports
13. Utilities surveys, including: Telecommunications Surveys. Wireless networks and satellite reception Surveys, Electrical infrastructure and capacity Surveys, Gas network infrastructure and capacity Surveys, Sewage and drainage capacity Surveys, Existing water supply infrastructure and capacity.

2.00 APPLICATION

The project which is the subject of this Request for Proposals (RFP).

3.00 PREFERENCES

3.01 SUBMITTALS

- a) Contractors shall give advance notification of all surveys to be undertaken to the Engineer.
- b) Contractors shall submit all Survey drawings and comprehensive Survey reports (for all relevant surveys) with the following information:

1. Date of survey
2. Details of the specification being followed
3. Outline methodology
4. Equipment make, model, serial numbers and calibration certificates
5. Names of surveyors involved and roles
6. Site photography, details of quality control for site and processing work
7. Survey issues or difficulties encountered on site (i.e. omissions, access etc.)

c) Contractors shall submit Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

3.02 QUALITY ASSURANCE

1. The surveyor is responsible for ensuring that his/her staff are qualified, competent, appropriately insured and trained to do the tasks for which they are engaged. Relevant national or regional licenses, and memberships of other equivalent professional bodies is acceptable.
2. Contractor is responsible for ensuring all equipment is calibrated/verified and checked prior to use and maintained as such throughout the period of survey works, as well as ensuring it is fit for the survey purpose required.
3. Any foreseen constraints identified by the Contractor must be raised in writing to the client during the tender period. Where constraints are identified after commissioning of works these shall be communicated as soon as practicable to the client and agreement sought on resolution/impact.

3.03 SAFETY, SECURITY, OPERATIONS

1. The Contractor shall inform the client in advance of the proposed access dates required for surveys, so that the client may make arrangements with the owners/occupiers
2. The Contractor shall advise the client of any access restrictions or related issues which could have an impact on the survey requirements or deliverables as soon as practical, and ensure all reasonable steps are taken to reduce adverse impacts. The Client/Employer and Contractor shall agree on any actions to resolve identified access issues or provide explicit agreement on omission from the survey scope of areas proven to be inaccessible.
3. Contractor is responsible for the prevention of damage to property and/or the environment caused by his/her works or the actions of surveyors or employees under his/her direct control. Appropriate measures should be put in place to mitigate damage done to structures, underground utilities and to the environment by survey markings.
4. In cases where the surveyor has been supplied keys for access to normally locked areas and where no additional client security measures are in place, the Contractor shall be responsible for securing the areas being surveyed for the duration of the works.

SECTION 303 - DEMOLITION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.6 (2006) Safety Requirements for Demolition Operations

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 61 National Emission Standards for Hazardous Air Pollutants

1.2 GENERAL REQUIREMENTS

Do not begin demolition or deconstruction until authorization is received from the Contracting Officer. The work of this section is to be performed in a manner that maximizes salvage and recycling of materials. Remove rubbish and debris from the project site; do not allow accumulations of resulting rubbish and debris. Store materials that cannot be removed daily in areas specified by the Contracting Officer. All demolition debris shall be removed from the island before Governments accept the building.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Existing Conditions; G

SD-07 Certificates

Demolition Plan; G

Deconstruction Plan; G

Notifications; G

Proposed demolition, and removal procedures for approval before work is started.

1.4 REGULATORY AND SAFETY REQUIREMENTS

Comply with local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSE/SAFE A10.6.

1.4.1 Notifications

PERFORMANCE SPECIFICATIONS

1.4.1.1 General Requirements

Furnish timely notification of demolition projects to regional, and local authorities in accordance with 40 CFR 61, Subpart M.

1.5 DUST AND DEBRIS CONTROL

Prevent the spread of dust and debris and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution.

1.6 PROTECTION

1.6.1 Existing Conditions Documentation

Before beginning any demolition or deconstruction work, survey the site and examine the drawings and specifications to determine the extent of the work.

Record existing conditions in the presence of the Contracting Officer showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs sized 100 mm will be acceptable as a record of existing conditions.

1.6.2 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas.

1.6.3 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction operations. Prior to start of work, the Government will disconnect and seal utilities serving each area of alteration or removal upon written request from the Contractor.

1.7 REQUIRED DATA

Prepare a Demolition Plan. Include in the plan procedures for careful removal and disposition of materials, coordination with other work in progress, a detailed description of methods and equipment to be used for each operation and of the sequence of operations.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

3.1.1 Structures

PERFORMANCE SPECIFICATIONS

- a. Remove existing structures and pier indicated to be removed to grade.
- b. Demolish structures in a systematic manner from the top of the structure to the ground. Complete demolition work above each tier before the supporting members on the lower level are disturbed. Demolish concrete piles in small sections. Remove structural framing members and lower to ground by suitable methods as approved by the Contracting Officer.

3.1.2 Utilities and Related Equipment

3.1.2.1 General Requirements

Do not begin demolition or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.1.3 Concrete

Saw concrete along straight lines to a depth of a minimum 50 mm. Make each cut in walls perpendicular to the face and in alignment with the cut in the opposite face. Break out the remainder of the concrete. At locations where the broken face cannot be concealed, grind smooth or saw cut entirely through the concrete. Remove concrete.

3.2 DISPOSITION OF MATERIAL

3.2.1 Title to Materials

Except for salvaged items specified in related Sections, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, shall become the property of the Contractor and shall be removed from Government property and the Island. Title to materials resulting from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition, deconstruction, and removal procedures, and authorization by the Contracting Officer to begin demolition and deconstruction. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

3.3 CLEANUP

Remove debris and rubbish from excavations. Remove and transport in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

3.4 DISPOSAL OF REMOVED MATERIALS

3.4.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other non-salvageable materials resulting from removal operations with all applicable federal, state and local regulations as contractually specified in the Demolition Plan.

3.4.2 Removal from Government / Client Property

Transport waste materials removed from demolished and deconstructed structures, except waste soil, from Government / Client property for legal disposal. Dispose of waste soil as directed.

-- End of Section --

SECTION 311 – FUNGUS/ TERMITE ERADICATION

1.0 GENERAL

1.01 DESCRIPTION

Fungus Eradication will refer to the elimination of molds and similar microbes. Termite Eradication will refer to treatment of ground nesting (subterranean) termites, and treatment of non-ground nesting termites.

1.02 SCOPE

Work to be completed under this section shall include all labour, equipment, plant and materials necessary to eradicate molds and microbes, and to eradicate both ground- nesting and non-ground-nesting termites.

Works may include:

1. For Mold and Microbe eradication in existing properties:
 - a. Air filtration
 - b. Containment of affected areas
 - c. Demolition of affected areas that cannot be treated or restored
 - d. Dehumidifying of air
 - e. Application of detergents, disinfectants, Fungicidal agents
2. For Termite eradication:
 - f. Application of Chemical termite control to soil and to foundation elements (subterranean termites)
 - g. Inspection to locate termite infected areas within the building (if existing)
 - h. Treatment of woodwork, masonry voids, electrical fixtures etc. (existing buildings)

1.03 PRODUCTS

1. For Mold and Microbe Eradication:
 - a. **Air Filtration Units (AFU) :** Air filtration unit with High Efficiency particulate air (HEPA) filtered vacuum and / or exhaust ventilation equipment with a filter system capable of retaining 99.97 percent of particles 0.3 microns 1.2 by 10-6 inch or larger as indicated in UL 586. Discharge air from any AFUs located in the work area containment to the outside environment when creating a negative pressure containment to create a negative pressure relative to occupied areas of 5 pascals 0.02 inch H2O to 10 pascals 0.04 inch H2O. Discharge air in excess of that required for creating the proper negative pressure to the work area. The AFUs shall provide four to six air changes per hour in the work area. Under no circumstances may air from AFUs discharge to an occupied area.
 - b. **Dehumidifiers:** To maintain humidity below 60%
 - c. **Fungicidal Agents:** A coating material that contains an EPA registered fungicide that inhibits the spread and growth of mold with the ability to withstand moist and humid conditions
 - d. **Disinfectants or Biocide Sanitizing Solutions:** One of three groups of antimicrobials registered by the EPA for public health uses. The EPA considers an antimicrobial to be a disinfectant when it

PERFORMANCE SPECIFICATIONS

destroys or irreversibly inactivates infectious or other undesirable organisms, but not necessarily their spores.

2. Personal protective Equipment (Mold and Microbe Remediation):

Respirators as per Table 2 of EPA 402-K-01-001

Disposable clothing: is recommended during a medium or large remediation project to prevent the transfer and spread of mold to clothing and to eliminate skin contact with mold.

- Limited: Disposable paper overalls can be used.
- Full: Mold-impervious disposable head and foot coverings, and a body suit made of a breathable material, such as TYVEK®, should be used. All gaps, such as those around ankles and wrists, should be sealed (many remediators use duct tape to seal clothing)

For Termite Eradication:

3. **Termiticides** – The Contractor shall be responsible for application of pesticides according to the product label. All pesticides used by the Contractor must be registered with the Environmental Protection Agency (EPA)

2.00 APPLICATION

1. Mold and Microbe Eradication: Not applicable for this project
2. For Termite Eradication: Subterranean treatment for termites at foundations as specified

3.00 PREFERENCES

3.01 ENVIRONMENTAL

1. Follow mold remediation guidelines presented in Table 1 of the EPA 402-K-01-001
2. Dispose of contaminated bagged waste materials removed during this remediation as general construction debris. Follow all applicable local statutory requirements for the disposal of this material.

3.02 TEMPORARY PROTECTION

Follow mold containment guidelines as presented in Table 2 of the EPA 402-K-01-001

3.03 SUBMITTALS

For Mold and Microbe Remediation:

1. Submit a job-specific, plan for final approval prior to start of work. The plan shall address the following items at a minimum:
 - a. Description of materials to be remediated, providing location and quantities (map if available), and methods to be used for remediation.
 - b. Types of biocides and fungicidal agents, (EPA).

PERFORMANCE SPECIFICATIONS

c. Containment procedures to include description and locations of engineering controls and decontamination unit to include entry and exit procedures (provide sketch of floor plan showing location of containment barriers and decontamination units).

Plan shall include locations of AFUs and AFU discharges to the outside.

d. Description of personal protective equipment to be used during the remediation.

e. Construction barricades and barriers in occupied areas.

f. HVAC Shut down and start-up procedures.

g. HVAC Evaluation and remediation procedures.

h. Moisture and relative humidity control procedures and equipment.

1. For Termite treatments:

Prior to commencing application of termiticide, submit a Termiticide Application Plan addressing the following items:

- a. Proposed sequence of treatment work including dates and times of application
- b. Termiticide trade name
- c. Epa registration number
- d. Chemical composition
- e. Concentration of original and diluted material
- f. Formulation
- g. Manufacturer's recommended application rates
- h. Regional requirements
- i. Area or volume to be treated
- j. List of equipment to be used

3.04 QUALITY ASSURANCE

For Mold and Microbe Remediation:

1. Clearance Criteria Clearance will be based on visual assessment (all visible mold removed, all visible dust removed, based on a "white glove" test) . "White glove" test shall consist of wiping the surface with a clean cloth of color suitable to reveal expected type of dust. For most surfaces, a white cloth is suitable. For GWB dust, a dark cloth may be more appropriate. b. Failed remediation areas will be re-cleaned and the AFUs kept in operation another 12 hours, followed by another visual assessment. Subsequent failures will follow the same routine until a pass condition is secured.

For Chemical Termite Control:

2. Submit a list of equipment to be used. Conduct calibration test on the application equipment to be used immediately prior to commencement of termiticide application. Measure the volume and contents of the application tank. Testing must confirm that the application equipment is operating within the manufacturer's specifications and meets the specified requirements. Submit written certification of the equipment calibration test results within 1 week of testing.

3.05 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement. Safety Precautions to include lockout / tag-out, fall protection, confined space entry procedures, and fire protection. Description of the method to be employed to control cross contamination of areas not in the work area shall be included. A risk assessment related to the suitability of people to occupy areas adjoining the remediation area while remediation activities are ongoing shall be included.

1.00 REFERENCED STANDARDS

PERFORMANCE SPECIFICATIONS

1. EPA 402-K-01-001: Mold Remediation in Schools and Commercial Buildings
2. UL 586 Standard for High-Efficiency Particulate, Air Filter Units

5.00 DURABILITY

1. Life expectancy for chemical termite barriers shall be no less than 5 years.

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. The contractor shall guarantee that all work performed related to mold and microbe remediation under this contract to be free from defects in all materials and workmanship for a period of 12 months from the date of final acceptance (substantial completion).
2. Termite treatment: Include in the warranty against infestations or re-infestations by subterranean termites annual inspections of the buildings or building additions during the warranty period. If live subterranean termite infestation or subterranean termite damage is discovered during the warranty period, and the soil and building conditions have not been altered in the interim:
 - a. Retreat the site and perform other treatment as may be necessary for elimination of subterranean termite infestation;
 - b. Repair damage caused by termite infestation; and
 - c. Re-inspect the building approximately 180 days after the re-treatment

SECTION 400 - EARTHWORKS

PART 1.0 - GENERAL:

1.1 Description

- 1.1.1 General: Furnish all labor, materials, equipment and services required to complete all work as specified herein indicated, and/or shown on the drawings.
- 1.1.2 Work includes but is not limited to:
 - 1. Site Preparation
 - a. Stripping of top soil
 - b. Removal and disposal of unsuitable materials
 - 2. Excavations including excavation and hauling from borrow pits.
 - 3. Compaction at 6" finished per layer
 - 4. Subgrade Finishing
- 1.1.3 Standards: Except as modified by governing codes and by contract documents, comply with the provisions and recommendations of the following:
 - 1. American Society for Testing and Materials (ASTM)

PART 2.0 - PRODUCTS:

2.1 Materials

- 2.1.1 General: Materials to be used for the project shall be free from debris, wood, refuse, unsound particles or objectionable matters.
- 2.1.2 Selected Fill: Fill shall be sand, gravel, friable earth or lean clay of low plasticity subject to approval of the Testing Laboratory.

For structures and under footing or concrete slab on grade shall conform to the general requirements for soil materials and shall be classified as GW, GM, GP, SW, SM by the ASTM D2487 and conforming to the following:

- a. Liquid Limit shall not exceed 25% when tested in accordance with ASTM D 4318.
- b. Plasticity Index - shall not exceed 12% when tested in accordance with ASTM D 4318.
- c. CBR Value \geq 30% (Blue Limestone Crusher-run or Quarry Fill/Spoil or Pitrun).
- d. Lift should be no greater than 6" per layer compacted to 95% MDD

PERFORMANCE SPECIFICATIONS

Potentially expansive soil (CH/MH) presents at site and must be removed underneath all structures. If to be used as fill this shall be under at least min. 3.0m high backfill of **Non Plastic Fill Material**:

- 2.1.3 Granular Fill: Shall conform to the general requirements for soil materials above and shall be clean, crushed stone or gravel conforming to ASTM C33.
- 2.1.4 Borrow Fill: If additional material is required for fill in excess of that obtained from excavation, obtain same from sources to be tested, and approved by independent Testing Laboratory and acceptable to the Engineer.

PART 3.0 - CONSTRUCTION REQUIREMENTS:

3.1 Site Preparation

- 3.1.1 Stripping: All areas of excavation shall be stripped of all vegetation, debris, organic materials, and unsatisfactory materials in accordance with field layout to a minimum of 8" or 200mm.
 - a. Topsoil shall be hauled and stockpiled to a designated area for later use by the landscaping contractor or agriculturist.
 - b. Unsatisfactory materials shall be disposed off site or as directed by Owners Representative at contractor's expense.
 - c. All exposed subgrade shall be subjected to two ironing passes to seal the subgrade. Temporary drainage slopes shall be induced draining into temporary ditches and drains.
- 3.1.2 Compaction Requirement: Subgrade and fill materials shall be compacted with acceptable equipment to achieved the specified percentage of maximum density at optimum moisture as determined by ASTM D698 or ASTM D-1557.

Contractor shall undertake trial compaction works to determine most the suitable equipment and procedure for compaction.

3.1.3 Excavation:

- 1. General: Excavation for all works shall be to lines, grades and dimensions shown on the drawings. Keep excavations free of water while construction is in progress.
- 2. Excavated materials, which are not suitable, for fill shall be disposed off the site in dumps to be provided by contractor.
- 3. All excavations > 1.50m shall be shored to ensure safety. Shorings shall be designed by Contractor's Registered Engineer by BOETT or equivalent.

3.1.4 Filling and Backfilling:

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1. This work shall consist of furnishing, placing and adequate compaction of suitable materials of acceptable quality in accordance with specification, to the lines, grades and dimensions shown on the drawings and as required by the Engineer.
2. Placement of backfilling materials shall be not exceed 200mm thick compacted to minimum compaction requirement. Quality of compaction shall be monitored by FIELD DENSITY TEST (FDT).
3. All areas to be filled shall be inspected by the Owner's Representative prior to placing of fill materials and tested for adequacy of compaction.

3.2 Quality Control

- 3.2.1 The following tests shall be performed by an Independent Testing Laboratory approved by the owner/engineer to determine the suitability of materials for the project. The results of these tests are final and binding to all parties.

<u>Tests</u>	<u>Test Procedure</u>	<u>Frequency</u>
1. Liquid Limit, Plastic Limit and Plasticity Index	ASTM D 4318	One (1) test for each type of material required.
2. Fill Classification	ASTM D 2487	One (1) test for each type of fill.
3. Field Density Test	ASTM D 1556	One (1) test for every 300 sq.m. of lift at random locations directed by the Engineer, but in no case less than three (3) tests per lift. One (1) test for every footing subgrade and backfill.
4. Moisture Density Relationship	ASTM D 698	One (1) test for each Density type of soil. Compaction shall be 95% MDD.
5. Moisture Density Relationship	ASTM D 1557	One (1) test for each Density type of soil. Compaction shall be 95% MDD.

3.3 Protection of Existing or New Facilities

PERFORMANCE SPECIFICATIONS

- 3.3.1 Exercise particular care when excavating in the vicinity of existing structure or those under construction. The contractor shall be entirely responsible for the strength and adequacy of all bracing's and shoring and for the safety and support of such construction for any movement, settlement and damage.
- 3.3.2 Provide barricades, warning lights, signs and other control activities adjacent to all excavation both internal and at perimeter of construction site.
- 3.4 Environmental Protection
 - 3.4.1 Contractor shall preserve and protect all trees and vegetation not identified for removal or destruction.
 - 3.4.2 Contractor shall strip and grub only the area it can finish in a day and subject this to ironing passes and drainage slopes construction at the end of each working day.
 - 3.4.3 Careless dumping of spoils is not allowed and contractor shall only dispose in areas designated by the Owner or outside the property.
 - 3.4.4 All tree stumps, organic materials, roots, etc., encountered in excavation shall be completely removed at no cost to the owner before backfilling.

SECTION 501 – IN SITU CONCRETE (GENERAL)

1.0 GENERAL

1.01 DESCRIPTION

In- situ Concrete refers to concrete work which is carried out on the construction site itself, often in the finished position, as opposed to in an off- site location (as with pre- fabrication or pre- assembly techniques). Concrete shall be composed of the following: Portland cement, coarse aggregates such as crushed stone, fine aggregates such as sand, and water.

1.02 SCOPE

Work to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install. All poured-in-place concrete, together with all miscellaneous and appurtenant items, as shown on the architectural and structural plans specific to the project. The work shall include, but not be limited to supplying and placing reinforcing steel; and supplying, placing, vibrating, heating and curing concrete.

1.03 PRODUCTS

In situ concrete shall include a combination of the following products / elements:

1. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - a. Portland Cement shall be fresh stock of an approved standard brand meeting the requirements of ASTM C 150, Standard Specification for Portland Cement.
 - b. Fly Ash shall have a high fineness and low carbon content and shall exceed the requirements of ASTM C 618, Class 7 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
2. Concrete Aggregates:
 - a. Unless otherwise specified all aggregate shall be normal weight aggregate in accordance with ASTM C 33, Standard Specification for Concrete Aggregates.
 - b. Aggregate for concrete shall consist of clean crushed stone or gravel having hard, strong, uncoated particles free from injurious amounts of soft, thin, elongated or laminated pieces, alkali, organic or other deleterious matter.
 - c. Maximum aggregate size shall be ¾-inch. The maximum permissible percentage of elongated particles shall not exceed 5 percent by weight.
 - d. Provide aggregates from a single source.
 - a. Concrete batched away from the job and delivered in mixer or agitator trucks shall conform to requirements of ASTM C94, Standard Specification for ready-mixed concrete.
3. Fine Aggregate:
 - a. Shall consist of sand, stone screening, or other inert materials with similar characteristics having clean, strong, durable, uncoated grains and free from lumps, soft or flaky particles, clay, shale, alkali, organic matter or other deleterious substances with reactivity to alkali in cement.
4. Water:
 - a. Shall be potable water in accordance with ASTM C94, Standard Specification for ready-mixed concrete.

PERFORMANCE SPECIFICATIONS

5. Flexible PVC water stops:
 - a. Provide PVC water stops in all construction joints in concrete walls and in concrete beams and slabs. PVC water stops shall also be provided between concrete beams and slabs at all expansion joints to form a continuous diaphragm. Install in longest lengths practicable.
 - b. Support and protect exposed water stops during progress of the Work.
 - c. Field fabricate joints in water stops according to manufacturer's written instructions.
6. Vapour Retarders:
 - a. Sheet Vapour Barrier shall be minimum 10 mil polyethylene film that complies with ASTM C171, Standard Specification for Sheet Materials for Curing Concrete, and meets or exceeds test for water retention, ASTM C 156(20), Standard Test Method for Water Loss [from a Mortar Specimen] Through Liquid Membrane-Forming Curing Compounds for Concrete.
 - b. Place, protect, and repair sheet vapour retarder according to ASTM E1643, Standard Practice For Selection, Design, Installation, And Inspection Of Water Vapour Retarders Used In Contact With Earth Or Granular Fill Under Concrete Slabs, and manufacturer's written instructions.
7. Crushed Stone Fill:
 - a. Crushed Stone Fill shall be uniform 1-inch stone, no fines, in conformance to ASTM C33, Standard Specification for Concrete Aggregates.
8. Formwork:
 - a. Shall be designed in accordance with ACI 347, Recommended Practice for Concrete Formwork, (latest edition) unless otherwise noted.

2.00 APPLICATION

Cast-in-Place concrete construction may apply to the following building elements:

1. Exterior Concrete.
2. Footing and Piers.
3. Slabs on Grade.
4. Columns.
5. Slabs above ground floor.
6. Concrete Beams.

3.00 PREFERENCES

3.01 DESIGN

1. Class and Finish of supported slabs on grade shall be Class 2 as per ACI 302.1R.
2. Recommended strength and maximum slump at point of placement for concrete floors shall be as according to Table 6.1 as per ACI 302.1R.

3.02 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology.

PERFORMANCE SPECIFICATIONS

3. Drawings detailing the work to be done. Such drawings shall be furnished by a licensed Engineer. Examples of such include.
 - a. Foundation Plan – fully dimensioned, foundation schedule and details, wall sections, mechanical pad details, and related miscellaneous details. All details, plans and sections shall show reinforcing.
 2. Pier Details and Pier Schedule.
 - b. Necessary Floor Plans – fully dimensioned plans with all depressions, rises, reinforcing steel, to include placement and accessories.
 - c. Miscellaneous Items – All other reinforced concrete items shall be drawn at such scale as to give full dimensions, details and reinforcing with accessories as required.

3.03 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his representative.
3. The Contractor shall submit a schedule of his activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.04 SAFETY, SECURITY, OPERATIONS

4. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement.

4.00 REFERENCED STANDARDS

1. ACI 318 – Building Code Requirement for Reinforced Concrete.
2. ACI 301 – Specifications for Structural Concrete for Buildings.
3. ACI 305 – Recommended Practice for Hot Weather Concreting.
4. ACI 347 – Recommended Practice for Concrete Formwork.
5. ACI 302 – Guide to Concrete Floor and Slab Construction.
6. ASTM C150 – Standard Specification for Portland Cement.
7. ASTM C618, Class 7 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
8. ASTM C33 – Standard Specification for Concrete Aggregates.
9. ASTM C171 – Standard Specification for Sheet Materials for Curing Concrete.
10. ASTM C156-20 – Standard Test Method for Water Loss [from a Mortar Specimen] Through Liquid Membrane-Forming Curing Compounds for Concrete.
11. ASTM E1643-18a – Standard Practice For Selection, Design, Installation, And Inspection Of Water Vapour Retarders Used In Contact With Earth Or Granular Fill Under Concrete Slabs.
12. ASTM A1064 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic,

PERFORMANCE SPECIFICATIONS

excluding joint sealers.

2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage.

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. Cast in Place concrete works shall have a warranty for a period of one year against faulty workmanship including: installation defects, cracking and settling. The warranty excludes discoloration or efflorescence of concrete based materials, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.

SECTION 502 - CONCRETE FORMWORKS

PART 1.0 - GENERAL:

1.1 Description

1.1.1 SCOPE

- a. Furnish materials and equipment and perform labor required to complete the work.
- b. All work shall be done in accordance with the minimum requirements of the American Concrete Institute Building Code for reinforced concrete ACI 318-08 or latest except as modified herein.
- c. Forms - shall be built with sufficient strength and rigidity to resist and carry the mass and pressure of concrete during placement and consolidation. Forms shall be free of bulge and warp.
- d. All formed surfaces for Concrete shall be true to finish and must be smooth. Mortar patching shall not be allowed. Provide Phenolic resin form plywood or equivalent for exposed concrete to assure smooth finish.

1.2. PROTECTION

- a. Provide adequately braced forms that will produce correctly aligned concrete, able to meet the specific weights and size pressure of newly placed concrete.
- b. Choose form fittings that are adequate for the purpose.
- c. Exercise care in the choice of surface forms and form fittings that will be in contact with concrete.

1.1.2 Work includes but is not limited to:

1. Construction of footing, grade beam, wall footing, pedestal column, slab-on-grade; super structure column, beams, girder, slab (if concrete frame/superstructure) etc.
2. Construction of ramp, walkway, roadway and parking pavement (if applicable) etc.

1.1.3 Standards

Except as modified by governing codes and by contract documents, comply with the provisions and recommendations of the following:

1. American Concrete Institute (ACI)
2. American Society for Testing and Materials (ASTM)

PART 2.0 - PRODUCTS:

2.1 Materials

- 2.1.1 Use minimum 5/8" plywood, or surfaced lumber forms where it will be given the most advantageous in the specific concrete work involved. It should be free from warp and grass deformities sufficiently braced with solid lumber and applied with form released agent at its casting surface before each casting.

PART 3.0 - CONSTRUCTION REQUIREMENTS:

3.1 FORMS

- a. Check all forms to the shape, lines, and dimensions of the member as called for in the plans.
- b. Check all formwork for plumbness, correct alignment and twist.

- c. Cast all forms with form oil before reinforcement is placed. Remove all surplus oil on form surfaces.

3.2 FORMS & SHORING (REMOVAL)

Remove forms only upon approval of the Engineer in such manner and at such time as to ensure the complete safety of the structure in no case shall the supporting forms and shoring be removed until the members have attained sufficient strength to safely support weight and load thereon. The result of suitable control has attained sufficient strength to permit removal of shoring and supporting forms. Cylinders required for control test shall be made in addition to those required by this specifications.

3.3 TOLERANCE LIMITS

Set and maintain concrete form so as to insure completed works within the following tolerance limits.

1) Variations

- a. In the line and surface of columns, walls, and rise

In 10 feet 1/4 inch

In any storey or 20' max..... 3/8 inch

- b. For exposed corner columns, control joints, grooves and other conspicuous lines

In anyway 20' or more.....1/4 inch

In 40' or more1/2 inch

- 2) In variation of the level from the grade indicated on the drawings.

- a. In floors (before removal of forms, ceiling, soffits and rises)

In 10 feet1/4 inch

In anyway or 20 max3/8 inch

For 40' or more3/8 inch

- b. For exposed girts, fascia, horizontal grooves and other conspicuous lines

In anyway or 20' max1/4 inch

In 40 or more1/2 inch

3.) Footings

- a. Variations of dimension in plan

Minus1/2 inch

Plus2 inches ;

(applies to concrete only and not to reinforcing bars and dowels)

4) Variation in steps if there is stair

- a. In a flight of steps

Rise..... 1/8 inch

Tread 1/4 inch

- b. In consecutive steps

Rise 1/16 inch

Tread 1/8 inch

SECTION 503 - CONCRETE REINFORCEMENT

PART 1.0 - GENERAL:

1.1 Description:

- 1.1.1 General: Provide all labor, materials, equipment, transportation and services required to complete all work as specified herein, indicated, and/or shown on the drawings.
- 1.1.2 Work includes but is not limited to:
 - 1.1.2.1 Provision of all concrete reinforcement.
- 1.1.3 Standards: Except as modified by governing Codes and Contract Documents comply with the applicable provisions and recommendations of the following:
 - 1. American Concrete Institute (ACI)
 - 2. American Society for Testing and Materials (ASTM)

PART 2.0 - PRODUCTS:

2.1 Materials:

- 2.1.1 Reinforcing Bars
 - a. Deformed Bars, Grade 60 conforming to ASTM A-615
 - b. Welded Wire Fabric shall conform to ASTM A185. Shall be lapped two full mesh panels and tied securely.
- 2.1.2 Accessories
 - 1. Accessories for proper installation of reinforcement shall conform to ACI 318-77 "Building Code Requirements for Reinforced Concrete" and/or manual of Standard Practice for Reinforced Concrete Construction.

PART 3.0 - CONSTRUCTION REQUIREMENTS:

3.1 Installation:

- 3.1.1 General: All reinforcement bars, stirrups, wire fabrics and other reinforcing materials shall be provided as indicated or required by this specification, together with the necessary accessories to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from rust, oil, grease, clay and other deleterious matters that would reduce or destroy the bond.
- 3.1.2 Reinforcing steel shall be placed accurately and securely.
- 3.1.3 Splicing of reinforcement shall be in accordance with ACI 318, except as indicated otherwise or modified herein. Staggered where possible.

- 3.1.4 Coordinate with other trades and properly place and locate in position all necessary reinforcement, dowels, anchors, inserts, metal ties and other fastening devices required.

3.2 Quality Control:

All reinforcement shall be tagged and temporarily stored in proper manner upon arrival at site and shall not be used before deformation have been measured and until tensile and bend test have been performed and reviewed by an approved Independent Testing Laboratory.

1. One (1) tensile test and one (1) bend test of each size per 5,000 kilograms or portion thereof but not less than 1 test for any batch delivery.
2. Test field placement by physical measurement of sizes and spacing after placement.
3. Provide additional testing as directed for reinforcing steel. Allow 20 percent additional tensile and bend tests.
4. Contractor shall submit Mill Certificates to verify and check if the proposed materials conform to specification.

SECTION 601 – BLOCK WALLING

1.0 GENERAL

1.01 DESCRIPTION

Block Walling shall incorporate the construction process of a wall composed of Concrete Masonry Units and other elements that comprise the wall. Walls are to be constructed in such a manner so as to provide fire resistance and security to the spaces enclosed therein.

1.02 SCOPE

Block Walling as pertaining to the project shall include all labour, equipment, plant and materials necessary to furnish and install:

1. Interior walls:
 - a. Non-load bearing
 - b. Load bearing
2. Exterior walls:
 - a. Non-load bearing
 - b. Load bearing

1.03 PRODUCTS

Block Walling may include a combination of the following products/ elements:

1. Concrete masonry units
 - a. Hollow concrete masonry units shall be in accordance with ASTM C90 Standard Specification for Loadbearing Concrete Masonry Units
 - b. The manufacturer shall certify that the masonry units meet all requirements of specified standards as specified hereinafter.
2. Vent blocks
 - a. Vent blocks shall be supplied by a manufacturer and approved by the Engineer.
3. Mortar and grout
 - a. Mortar shall be strictly in accordance with ASTM C270 – Standard Specification for Mortar for Unit Masonry and shall be used for laying masonry units.
 - b. Grout shall be used for filling the cores of masonry units in the manner specified hereinafter or as directed by the Engineer.
4. Joint reinforcement
 - a. Joint reinforcement to comply with: ACI 530.1/ ASCE 6-02/ TMS 602-02 – Specification for Masonry Structures.
5. Vertical reinforcement
 - a. All vertical reinforcing steel shall be plain bars conforming to ASTM A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
6. Horizontal reinforcement
 - a. Unless otherwise specified, horizontal reinforcement shall be provided at every third course in masonry walls

- b. Reinforcement shall consist of an approved welded wire mesh cut to match the thickness of the wall with at least two wires in longitudinal direction or brick force.
- c. Lateral ties between two bars shall be at maximum 400mm centres.
- d. The mesh shall be laid continuously in mortar bed with laps not less than 300mm.
- e. Specifically fabricated L- and T-junctions shall be provided at wall intersections.

7. Lintels

- a. Install lintels over openings
- b. Bearing: to comply with engineers calculations

8. Control and expansion joints (define)

- a. All electrical instrumentation, piping and other embedded items or conduits, etc., shall not be installed until the mortar and grout have attained their specified strength, unless these are installed simultaneously with the construction of the wall.
- b. Vertical conduits shall be placed in unoccupied cells and horizontal conduits shall be placed approximately at the centre of a block height.
- c. Cutting of walls shall be done in a manner that will prevent damage or weakening to the wall that may affect its structural stability and appearance.
- d. Damage to or cutting of vertical reinforcing steel shall not be permitted.
- e. All cut areas in walls shall be repaired with mortar and finished flush with the face of the wall.
- f. Where the wall is to be finished fair-faced, conduits shall be installed simultaneously with the construction of the wall.

9. Wall anchorage

- a. A Masonry walls shall be anchored to all floors, roofs, columns, walls, etc. which provide lateral support for the walls as directed by the Engineer.
- b. Masonry walls that meet or intersect shall be bonded or anchored to each other by interlocking of masonry units from each wall. The intersection points of walls shall be reinforced as specified by the Engineer.

10. Fair Faced Block work

- a. Where block walls are required to be finished fair-faced, masonry unit shall be consistent in colour and texture.
- b. Masonry units shall be free from chips, cracks and other defects. All units with such defects shall be rejected. Making good with mortar shall not be permitted.
- c. All horizontal and vertical joints shall be uniform in depth, thickness, colour and properly aligned.
- d. All cuts in masonry units shall be sawed. Rough cutting made good with mortar shall not be permitted.
- e. After installation, all units shall be free from mortar on exposed surfaces.
- f. All surfaces of exposed block work shall be rubbed so as to expose a smooth surface.

2.00 APPLICATION

1. Interior wall partitions.
 - a. Partitions providing vertical separation between adjacent spaces on the interior of the building.
2. Exterior walls.
 - a. Partitions providing vertical separation between exterior and interior space and which exclude: uninvited people, animals, insects; weather.
3. Where block walling elements also function as elements defined within another element group, they must meet the requirements of both groups.

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

13. Materials listing and certification indicating that products adhere to standard specifications.
14. Installation methodology

3.03 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his representative.
3. The Contractor shall submit a schedule of his activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

5. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

1. ASTM C90 – Standard Specification for Loadbearing Concrete Masonry Units
2. ASTM C270 – Standard Specification for Mortar for Unit Masonry and shall be used for laying masonry units.
3. ACI 530.1/ ASCE 6-02/ TMS 602-02– Specification for Masonry Structures.
4. ASTM A615– Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
5. IBC 2018 CHAPTER 2100 - Masonry

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage
3. Joint sealers in exterior walls: Lifespan expectancy equal to that specified for primary weather barriers.

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

PERFORMANCE SPECIFICATIONS

1. Block wall shall have a warranty for a period of one year against faulty workmanship including: installation defects, breakage and settling. The warranty excludes discoloration or efflorescence of concrete based materials, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.

SECTION 701 – STRUCTURAL STEEL FRAMING

1.0 GENERAL

1.01 DESCRIPTION

Structural steel framing incorporates internal and external vertical and horizontal elements that are formed by a system of structural beams and columns.

1.02 SCOPE

Structural steel framing incorporates work to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install. The work shall include, but not be limited to installation of steel members; beams, columns and necessary connections.

1.03 PRODUCTS

Structural steel framing shall include a combination of the following products / elements:

1. Steel columns and beams:
 - a. Steel pipes to comply with: ASTM A53 Standard Specification for pipe, steel, black and hot-dipped, zinc – coated, welded and seamless.
 - b. Steel hollow structural section to comply with: ASTM A500 Standard Specification for cold – formed welded and seamless carbon steel structural tubing in rounds and shapes.
2. Steel connections:
 - a. Steel structural wide flange shapes to comply with: ASTM A992 Standard Specification for structural steel shapes.
 - b. Steel bolts to comply with: ASTM A307 Standard Specification for carbon steel bolts, studs and threaded rod 60 000 PSI tensile strength.
 - c. Steel nuts to comply with: ASTM A563 Standard Specification for carbon and alloy steel nuts.
 - d. Steel plates to comply with: ASTM A36 Standard Specifications for carbon structural steel.

2.00 APPLICATION

Structural steel framing may apply to the following building elements:

1. Exterior structural framing:
 - a. Metal roof framing.
2. Internal structural framing:
 - a. Internal load bearing walls.
 - b. Elevator systems.
 - c. Stair cases.

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology.
3. Drawings detailing the work to be done. Such drawings shall be furnished by a licensed Engineer.

3.02 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement.

4.00 REFERENCED STANDARDS

1. ASTM A53 – Standard Specification for pipe, steel, black and hot-dipped, zinc – coated, welded and seamless.
2. ASTM A500 – Standard Specification for cold – formed welded and seamless carbon steel structural tubing in rounds and shapes.
3. ASTM A992 – Standard Specification for structural steel shapes.
4. ASTM A307 – Standard Specification for carbon steel bolts, studs and threaded rod 60 000 PSI tensile strength.
5. ASTM A563 – Standard Specification for carbon and alloy steel nuts.
6. ASTM A36 – Standard Specifications for carbon structural steel.

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers.
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage.

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. Structural steel framing shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.

SECTION 802 – CURTAIN WALLING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A.Extruded aluminum curtainwall.
- B.Extruded aluminum doors and windows.

1.2 REFERENCES

- A.American Society of Civil Engineers (ASCE):
 - 1.ASCE/SEI 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
- B.American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):
 - 1.ASHRAE 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings.
- C.ASTM International (ASTM):
 - 1.ASTM A 36 - Standard Specification for Carbon Structural Steel.
 - 2.ASTM A 123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 3.ASTM A 153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 4.ASTM A 1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
 - 5.ASTM A 1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
 - 6.ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 7.ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 8.ASTM B 308 - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
 - 9.ASTM B 429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
 - 10.ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
 - 11.ASTM C 1184 - Standard Specification for Structural Silicone Sealants.
 - 12.ASTM C 1401 - Standard Guide for Structural Sealant Glazing.
 - 13.ASTM D 2000 - Standard Classification System for Rubber Products in Automotive Applications.
 - 14.ASTM D 2287 - Standard Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds.
 - 15.ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 16.ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - 17.ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
 - 18.ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
 - 19.ASTM E 783 - Standard Test Method for Field Measurement of Air Leakage Through Installed

Exterior Windows and Doors.

- 20.ASTM E 1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.
- 21.ASTM E 1332 - Standard Classification for Rating Outdoor-Indoor Sound Attenuation.
- 22.ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
- 23.ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
- 24.ASTM E 1998 - Standard Guide for Assessing Depressurization-Induced Backdrafting and Spillage from Vented Combustion Appliances.
- 25.ASTM F 1642/GSA TS01 - Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings.

D.Builders Hardware Manufacturers Association (BHMA):

- 1.BHMA A 156.1 - American National Standard for Butts and Hinges.
- 2.BHMA A 156.3 - American National Standard for Exit Devices.
- 3.BHMA A 156.4 - American National Standard for Door Controls-Closers.
- 4.BHMA A 156.5 - American National Standard for Cylinders and Input Devices for Locks.
- 5.BHMA A 156.6 - American National Standard for Architectural Door Trim.
- 6.BHMA A 156.8 - American National Standard for Door Control - Overhead Stops and Holders.
- 7.BHMA A 156.16 - American National standard for Auxiliary Hardware.
- 8.BHMA A 156.21 - American National standard for Thresholds.

E.Glass Association of North America (GANA).

F.International building code (IBC).

G.National Fenestration Rating Council (NFRC):

- 1.NFRC 100 - Procedure for Determining Fenestration Product U-Factors.
- 2.NFRC 500 - Procedure for Determining Fenestration Product Condensation Resistance Values.

H.National Fire Protection Association (NFPA):

- 1.NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

I.Society of Protective Coatings (SSPC).

J.Structural Engineering Institute (SEI).

K.United States General Services Administration (GSA).

L.Underwriters Laboratories (UL):

- 1.UL 305 - UL Standard for Safety Panic Hardware.

1.3 SUBMITTALS

A.Product Data: Manufacturer's data sheets on each product to be used, including:

- 1.Preparation instructions and recommendations.
- 2.Storage and handling requirements and recommendations.
- 3.Product testing reports.
- 4.Installation methods.
- 5.Maintenance data.

PERFORMANCE SPECIFICATIONS

- B.Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1.Include coordinated dimensions for equipment and furnishings specified in other Sections.
 - a.Moisture draining provisions.
 - b.Expansion and contraction provisions.
 - c.Flashing.
- C.Delegated Design Submittal: Shop drawings complying with performance requirements and design criteria. Signed and sealed by professional Engineer licensed in Project location.
- D.Verification Samples: For each finish product specified, two samples, representing actual product, color, and finish.
- E.Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- F.Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic checking and adjustment, cleaning and maintenance.

1.4 QUALITY ASSURANCE

- A.Manufacturer Qualifications: Five years or more experience in manufacture of laboratory casework and equipment of type specified.
- B.Installer: Five years or more experience with installation of similar products, and acceptable to the manufacturer.
- C.Mock-Up: Provide a mock-up for evaluation of fabrication techniques and application workmanship.
 - 1.Install in areas designated by Architect.
 - 2.Do not proceed with remaining work until installation is approved by Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

- A.Store products in the manufacturer's unopened packaging until ready for installation.
- B.Protect finished surfaces from soiling or damage during handling and installation.

1.6 PROJECT CONDITIONS

- A.Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 WARRANTY

- A.Manufacturer's Warranty: Provide manufacturer's standard limited warranty for against breakage, corrosion, and delamination under normal conditions.
 - 1.Warranty Duration: 6 years.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A.Delegated Design: Engage a qualified professional engineer licensed in location of Project, for design of glazed curtain wall.
- B.Comply with performance requirements specified, determined by testing of systems representative of Project without failure. Withstand supporting structure movements including, but not limited

PERFORMANCE SPECIFICATIONS

to, story drift, twist, column shortening, long-term creep, and distributed and concentrated load deflections.

C.Structural Loads:

- 1.Wind Loads: As per IBC codes
- 2.Other Design Loads: As per IBC codes

D.Deflection of Framing Due to Design Wind Pressure:

- 1.Deflection Normal to Wall Plane per IBC Requirements: From edge of glass perpendicular in direction to glass plane; $1/175$ of glass edge length for each glazing lite, or amount that restricts edge deflection of glazing lites to $3/4$ in (19.1 mm), whichever is less.
- 2.Deflection Normal to Wall Plane per AAMA TIR-A11:
 - a.Spans up to 13 ft 6 in (4.1 m): Limited to $1/175$ of clear span.
 - b.Spans Greater than 13 ft 6 in (4.1 m): Limited to $1/240$ of clear span plus $1/4$ in (6.35 mm).
 - c.Limited to an amount restricting edge deflection of individual glazing lites to $3/4$ in (19.1 mm), whichever is less.
- 3.Deflection Parallel to Glazing Plane: $1/360$ of clear span or $1/8$ in (3.2 mm), whichever is smaller.
- 4.Deflection Parallel to Glazing Plane per GANA Glazing Manual: Not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than $1/8$ in (3.2 mm).
 - a.Operable Units: $1/16$ in (1.6 mm) minimum clearance between framing members and operable units.
- 5.Cantilever Deflection for Framing Members Overhanging an Anchor Point:
 - a.Perpendicular to Plane of Wall:
 - 1)Spans less than 11 ft 8- $1/4$ in (3.6 m): $1/175$ times span.
 - 2)Spans greater than 11 ft 8- $1/4$ in (3.6 m): $1/240$ of clear span plus $1/4$ in (6.35 mm).

E.Structural Performance per ASTM E 330:

- 1.Test at positive and negative wind-load design pressure. No deflection beyond specified limits.
- 2.Tested at 150 percent of positive and negative wind-load design pressures. No failure of materials, no structural distress, and no deformation of framing members beyond 0.2 percent of spans.

F.Air Infiltration per ASTM E 283: Fixed framing and glass area per ASHRAE 90.1:

- 1.Maximum air leakage: 0.06 cu ft per min per sq ft (0.30 L per s per sq. m).
 - a.Static-air-pressure differential: 1.57 lbf per sq ft (75 Pa) equivalent to windspeed of 25 miles per hr (40 km per hr).
 - b.Static-air-pressure differential: 6.24 lbf per sq. ft. (300 Pa) equivalent to windspeed of 50 miles per hr (80 km per hr).
- 2.Entrance Doors:
 - a.Maximum air leakage for Single Door: 0.5 cu ft per min per sq ft (2.54 L per s per sq. m).
 - 1)Static-air-pressure differential: 1.57 lbf per sq ft (75 Pa) equivalent to windspeed of 25 miles per hr (40 km per hr).
 - b.Maximum air leakage for Door Pairs: 1.0 cu ft per min per sq ft (5.08 L per s per sq. m).
 - 1)Static-air-pressure differential: 1.57 lbf per sq ft (75 Pa) equivalent to windspeed of 25 miles per hr (40 km per hr).

G.Water Penetration under Static Pressure per ASTM E 331: None.

1. Tested at static-air-pressure differential of 20 percent of positive wind-load design pressure but not less than 6.24 lbf per sq ft (300 Pa).
2. Tested at static-air-pressure differential of 20 percent of positive wind-load design pressure but not less than 10 lbf per sq ft (480 Pa).
3. Tested at static-air-pressure differential of 20 percent of positive wind-load design pressure but not less than 15 lbf per sq ft (720 Pa).

H. Water Penetration under Dynamic Pressure per AAMA 501.1: None.

1. Tested at dynamic pressure equal to 20 percent of positive wind-load design pressure but not less than 6.24 lbf per sq ft (300 Pa).
2. Tested at dynamic pressure equal to 20 percent of positive wind-load design pressure but not less than 10 lbf per sq ft (480 Pa).
3. Tested at dynamic pressure equal to 20 percent of positive wind-load design pressure but not less than 15 lbf per sq ft (720 Pa).
4. Water Leakage per AAMA 501.1: No uncontrolled water penetration or water appearing on normally exposed interior surfaces except due to condensation. Does not apply to water controlled by flashing and gutters, or water drained to exterior.

I. Interstory Drift: Test Performance according to AAMA 501.4: Pass. Accommodate design displacement of adjacent stories indicated.

J. Seismic Performance per ASCE/SEI 7: Pass.

1. Seismic Drift Causing Glass Fallout per AAMA 501.6: Pass.
2. Vertical Interstory Movement per AAMA 501.7: Pass

K. Energy Performance: Certify and label energy performance per NFRC:

1. Thermal Transmittance (U-factor) per NFRC 100: Fixed glazing and framing areas.
 - a. U-factor: 0.45 Btu per sq ft x h x degrees F (2.55 W per sq m x degrees K) maximum.
 - b. U-factor: 0.57 Btu per sq ft x h x degrees F (3.23 W per sq m x degrees K) maximum.
 - c. U-factor: 0.69 Btu per sq ft x h x degrees F (3.92 W per sq m x degrees K) maximum.
2. Solar Heat Gain Coefficient per NFRC 100: Fixed glazing and framing areas: 0.35.
3. Solar Heat Gain Coefficient per NFRC 100: Fixed glazing and framing areas: 0.40.
4. Solar Heat Gain Coefficient per NFRC 100: Fixed glazing and framing areas: 0.45.
5. NFRC 500 Condensation Resistance Rating: Fixed glazing and framing areas: 15.
6. NFRC 500 Condensation Resistance Rating: Fixed glazing and framing areas: 25.
7. NFRC 500 Condensation Resistance Rating: Fixed glazing and framing areas: 35.
8. NFRC 500 Condensation Resistance Rating: Fixed glazing and framing areas: 45.

L. Noise Reduction per ASTM E 90: Ratings per ASTM E 1332:

1. Outdoor-Indoor Transmission Class: Minimum 26.
2. Outdoor-Indoor Transmission Class: Minimum 30.
3. Outdoor-Indoor Transmission Class: Minimum 34.

M. Blast Resistance per ASTM F 1642:

1. Hazard Rating: No break.
2. Hazard Rating: No hazard.
3. Hazard Rating: Minimal hazard.
4. Hazard Rating: Very low hazard.
5. Hazard Rating: Low hazard.
6. Hazard Rating: High hazard.
7. Performance Condition per GSA-TS01: 1.
8. Performance Condition per GSA-TS01: 2.
9. Performance Condition per GSA-TS01: 3a.

PERFORMANCE SPECIFICATIONS

D.Brackets and Reinforcements: High strength aluminum with nonstaining, nonferrous shims for aligning system components.

E.Materials:

- 1.Aluminum: Alloy and temper recommended by manufacturer.
 - a.Sheet and Plate: ASTM B 209.
 - b.Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 - c.Extruded Structural Pipe and Tubes: ASTM B 429.
 - d.Structural Profiles: ASTM B 308.
- 2.Steel Reinforcement: Corrosion resistant zinc primer per SSPC-PS Guide No. 12.00. Prepare surfaces according to SSPC-SP COM, and applicable SSPC standard.
 - a.Structural Shapes, Plates, and Bars: ASTM A 36.
 - b.Cold Rolled Sheet and Strip: ASTM A 1008.
 - c.Hot Rolled Sheet and Strip: ASTM A 1011.

2.3 GLAZING

A.Glazing Components:

- 1.Glazing Gaskets: Corner sealed pressure glazing system. Resilient elastomeric materials, setting blocks, and shims.
- 2.Glazing Sealants: Use manufacturer recommended sealants.
- 3.Structural Glazing Sealants per ASTM C1401 and ASTM C 1184: Silicone based compatible with system components. Approved by sealant manufacturer for use in curtainwall installations.
 - a.Color: Black.
 - b.Color: Gray.
 - c.Color: As selected by Architect from manufacturer's selection.
- 4.Weatherseal Sealants: ASTM C 920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O. Silicone based sealants compatible with structural sealant and other components it contacts. Recommended by Manufacturer.
 - a.Color: Match structural sealant.

2.4 ACCESSORIES

A.Fasteners and Accessories: Manufacturer's standard.

- 1.Corrosion resistant, and compatible with adjacent materials.
- 2.Self locking devices not subject loosening due to thermal or structural movements.

B.Anchors: Adjustable 1 in (25 mm) minimum three way. Finish: recommended by manufacturer.

- 1.Concrete and Masonry Inserts: Per ASTM A 123 or ASTM A 153 requirements.

C.Concealed Flashing: Corrosion resistant, nonstaining, nonbleeding flashing recommended by manufacturer.

D.Cold applied asphalt mastic, non-asbestos per SSPC Paint 12.

- 1.Coating: 30 mil (0.762 mm).

2.5 FABRICATION

A.Welding to be limited to concealed locations. Descale or grind away spatter and oxides.

B.Fabrication and Assembly Characteristics:

- 1.Profiles: Straight with no defects or deformations.
- 2.Joints: Accurately fitted; coped or mitered.

3. Glazing Isolation from Framing: Physical and thermal
4. Framing and glazing accommodation of thermal and mechanical movement.

C. Glazing Field Replacement Provisions: Exterior and interior.

- D. Hardware, connectors, and anchors concealed from view.
1. Components curved to indicated radii.

E. Water Mitigation: Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.

F. Water Mitigation: Pressure equalized system or double barrier design with primary air and vapor barrier at interior side of glazed aluminum curtain wall and secondary seal weeped and vented to exterior.

G. Aluminum Extruded Curtainwall: Fabricate and assemble per manufacturer's standard methods.

H. Aluminum Extruded Doors and Windows: Fabricate and assemble per manufacturer's standard methods.

1. Reinforce as required to meet loading requirements.
 - a. Weather strip exterior doors.
 - b. Provide stops and silencers for interior doors.

2.6 ALUMINUM FINISHES

A. Clear Anodic Finish: Per AAMA 611.

1. AA-M12C22A41, Class I, 0.0007 in (0.018 mm) minimum.
2. AA-M12C22A31, Class II, 0.0004 in (0.010 mm) minimum.

B. Color Anodic Finish: Per AAMA 611.

1. AA-M12C22A42/A44, Class I, 0.0007 in (0.018 mm) minimum.
2. AA-M12C22A32/A34, Class II, 0.0004 in (0.010 mm) minimum.
3. Color: Match sample from Architect's.
4. Color: As determined by the Architect from Manufacturer's selection.

C. Baked Enamel or Powder Coat Finish per AAMA 2603:

1. Dry Film Thickness of 1.5 mils (0.04 mm) minimum.
2. Color and Gloss: Match sample from Architect.
3. Color and Gloss: As selected by Architect from manufacturer's selection.

D. High Performance Organic Finish:

1. Two coat fluoropolymer per AAMA 2604.
2. Two coat fluoropolymer per AAMA 2605.
3. PVDF or FEVE Resin: 50 percent by weight in color coat.
4. PVDF or FEVE Resin: 70 percent by weight in color coat.
5. Color and Gloss: Match sample from Architect.
6. Color and Gloss: As selected by Architect from manufacturer's selection.

E. High Performance Organic Finish:

1. Three coat fluoropolymer per AAMA 2605.
2. Four coat fluoropolymer per AAMA 2605.
3. PVDF or FEVE Resin: 50 percent by weight in color coat and clear top coat.
4. PVDF or FEVE Resin: 70 percent by weight in color coat and clear top coat.
5. Color and Gloss: Match sample from Architect.

6.Color and Gloss: As selected by Architect from manufacturer's selection.

PART 3EXECUTION

3.1 EXAMINATION

- A.Examine areas for requirements compliance, dimensions and other criteria that could affect installation. Report discrepancies to the Architect.
- B.Do not begin installation until substrates have been properly prepared.
- C.If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A.Clean surfaces thoroughly prior to installation.
- B.Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A.Install in accordance with approved submittals, manufacturer's instructions and the following:
 - 1.Install framing and other items rigid, straight, plumb, and level, with items laid out as shown on shop drawings.
 - 2.Be sure items are properly isolated to prevent corrosion or galvanic action.
 - 3.Clearance at vertical edges of doors shall be uniform top to bottom.
 - 4.Verify moisture properly drains from systems.
 - 5.No evidence of cutting, drilling, and/or patching shall be visible on the finished work.
 - 6.Finished surfaces shall be cleaned after installation and be left free of imperfections.

3.4 PROTECTION

- A.Take protective measures to prevent exposure to other construction activity.
- B.Protect installed products until completion of project.

3.5 FIELD QUALITY CONTROL

- A.Field Tests: Architect shall select areas to be tested as soon as a representative portion of the project has been installed, glazed, caulked and cured. Conduct tests with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies must be corrected by the Contractor or Manufacturer.
 - 1.Testing per AAMA 503: Performed by qualified independent testing agency.
 - a.Air Infiltration Tests: Per ASTM E 783.
 - b.Water Infiltration Tests: Per ASTM E 1105.
 - c.Water Spray Testing per AAMA 501.2: Test prior to starting interior finishing.
 - d.Perform Texting at 10, 35, and 75 percent completion.

3.6 CLEANING

- A.Clean surfaces to remove soiling, stains, dust, and dirt using materials acceptable to manufacturer.
- B.Touch up, repair or replace damaged products and defective work, as directed by Architect.

C. Leave installation area clean, free of residue and debris resulting from work of this Section.

3.7 DOOR HARDWARE SETS SCHEDULE

A. Designate the manufacturer products and design, grade, function, finish, size, of door hardware.

END OF SECTION

SECTION 809 – METAL PROFILED / FLAT SHEET CLADDING / COVERING

1.0 GENERAL

1.01 DESCRIPTION

Metal Profiled/ flat sheet cladding shall refer to metal panels into which profiles are induced by feeding them through banks of forming rollers. Typically used profiles are trapezoidal, sinusoidal or half round profiles. Cladding panels can be manufactured from prefinished steel or aluminium / aluminium alloys in a vast array of colours; providing a wide choice of aesthetic finish. These cladding sheets are then affixed to the steel structure of a building with concealed, non-penetrating fasteners.

1.02 SCOPE

Work to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install all metal roof sheets and soffit panels (where specified), including accessories. For metal flashings, see related SECTION 822- Aluminium strip/ sheet coverings/ flashings.

1.03 PRODUCTS

Metal Profiled / flat sheet cladding / covering shall include a combination of the following products / elements

1. Galvalume Sheets (Standing Seam): tension levelled flat panels with continuously interlocked standing seam; 24ga and 26ga galvalume conforming to ASTM-791, 80 KSI where a coating of aluminium / zinc alloy bonded to the steel base by a continuous hot dipping process.
2. Material: 0.032 inch (0.8 mm) aluminium, ASTM B 209 3105-H14 alloy onto 0.5mm.
3. Flashings: all exposed flashings shall be formed in same gauge, finish, colour and texture matching the panels.
4. Sealant: shall be elastomeric.

2.00 APPLICATION

Galvalume (Aluzinc) roof sheets (standing seam) shall be used in all metal roof applications as specified or required in this project.

3.00 PREFERENCES

3.01 DESIGN REQUIREMENTS

1. General: Factory fabricated panels; panels fabricated on site using portable roll former are prohibited.
2. Performance Requirements: Provide sheet metal roofing that has been manufactured, fabricated and

- a. Minimum 26GA. Steel sheets to be used.
- b. Wind Uplift: Provide UL 580 Class 90 rated assembly.
- c. ASTM-E-1646-95 and ASTM-E-331 water penetration tested ASTM-E-1680-95 and ASTM-E-283 air infiltration tested.
- d. ASTM-E-1592-98 and ASTM-E-330 uplift tested (24 ga. steel).
- e. ASTM-E-84 Class A fire rating on coating and substrate.

Contractor shall submit the following:

1. **Installer Qualifications:** Installer with documented experienced in performing work of this section who has specialized in the installation of work similar to that required for this project.
2. **Material Storage:** Store materials protected from exposure to harmful conditions. Store material in dry, above ground location:
 - a. Stack pre-finished material to prevent twisting, bending, abrasion, scratching and denting. Elevate one end of each skid to allow for moisture to run off.
 - b. Prevent contact with material that may cause corrosion, discoloration or staining.
3. **Protection of completed works:** Protect installed products until completion of project.

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instructions and manufacturer's warranty requirements.

4.00 REFERENCED STANDARDS

1. UL 580 – Safety Testing for Uplift Resistance of Roof Assemblies.
2. ASTM E-1646-95 – Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
3. ASTM E-331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
4. ASTM E-1680-95 – Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.
5. ASTM E-283 – Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
6. ASTM E-1592-98 – Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
7. ASTM E-330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
8. ASTM E-84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
9. ASTM A792 / A792M – Standard Specification for Steel Sheet, 55 percent Aluminium-Zinc Alloy-Coated by the Hot-Dip Process.

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers.
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage.

6.0 WARRANTIES, GUARANTEES AND MAINTENANCE

1. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official covering finish, including colour, fade, chalking and film integrity.
2. Warranty Period: minimum 20 years commencing on Date of Substantial Completion.

SECTION 905 – WATERPROOFING (LIQUID APPLIED WATERPROOF ROOF COATINGS)

1.0 GENERAL

1.01 DESCRIPTION

Liquid-applied membranes are applied on site in a liquid form which is allowed to set and form into a water impermeable membrane. They can be Bituminous-based or polymeric-based, monolithic and fully-bonded, and suitable for application over many substrates, e.g. including asphalt, bitumen and concrete.

1.02 SCOPE

1. Work to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install all liquid applied membranes to the roof slab.
2. Works may include:
 - a. Provision of reinforced, liquid applied waterproofing membrane system including membrane, penetration flashings, base flashings, and expansion joints.
 - b. Substrate preparation, cleaning, levelling and patching.
 - c. Insulation and base/ply sheet installation.
 - d. Temporary waterproofing and priming.
 - e. Waterproofing membrane installation.
 - f. Flashing installation and expansion joint installation.
 - g. Protective surfacing.
 - h. Alkalinity protection.
 - i. Preparation for overburden installation.

1.03 PRODUCTS

Liquid applied waterproofing coating shall include a combination of the following products / elements:

1. Waterproofing Membrane:
 - a. Cold Fluid-Applied Waterproofing- Single component, [reinforced,] high solids. ASTM C 836/C 836M, Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
2. Accessory Materials:
 - a. Installation instructions, recommended to produce complete waterproofing system meeting performance requirements, and compatible with waterproofing material and adjacent materials.
3. Primer:
 - a. Liquid primer meeting VOC limitations and recommended for substrate by waterproofing manufacturer.
4. Joint Sealant:

PERFORMANCE SPECIFICATIONS

- a. ASTM C 719, Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle), high performance, medium-modulus, low-VOC, UV-stable, non-sag elastomeric sealant approved by waterproofing manufacturer for adhesion and compatibility with waterproofing and accessories.
5. Expansion Joint:
 - a. Pre-compressed or Closed Cell, Monolithic Foam System. Foam Structure Must not Contain Unbonded Foam Laminations
6. Protection Course:
 - a. Waterproofing manufacturer's standard protection course material recommended for application.

2.00 APPLICATION

3. Liquid applied membranes shall be used on all flat roof slabs in locations shown within the design drawings.

3.00 PREFERENCES

3.01 ENVIRONMENTAL

1. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
2. Do not apply roofing/waterproofing membrane during or with the threat of inclement weather.
3. When ambient temperatures reach 85 degrees F (30 degrees C) or higher, follow Membrane System Manufacturer's recommendations for weather related additives and application procedures.
4. Ensure that substrate materials are dry and free of contaminants. DO NOT commence with the application unless substrate conditions are suitable. Contractor shall demonstrate that substrate conditions are suitable for the application of the materials.
5. Odour control and elimination measures are not typically necessary, but if required by the owner or his designated Representative, Contractor shall implement odour control and elimination measures prior to and during the application of the roofing/waterproofing materials. Control/elimination measures shall be field tested at off-hours.

3.02 TEMPORARY PROTECTION

1. Building components shall be protected adequately (with tarp or other suitable material) from soil, stains, or spills at hoisting points and area of application. Contractor shall be responsible for preventing damage from any operation under its contract. Any such damage shall be repaired at Contractor's expense to Owner's satisfaction or be restored to original condition.
2. Protect finished roofing/waterproofing membrane from damage by other trades. Do not allow waste products containing hydrocarbons such as petroleum, grease, acid, solvents, vegetable or mineral oil, animal oil or animal fat, or direct steam venting to come into direct contact with the membrane.

3.03 SUBMITTALS

Contractor shall submit the following:

1. Product Data: Provide current standard printed product literature indicating characteristics of membrane materials, flashing materials, components, and accessories product specification and

installation; submit copies of current Material Safety Data Sheets (MSDS) for components of the work:

- a. Preparation instructions and recommendations.
 - b. Storage and handling requirements and recommendations.
 - c. Cleaning methods.
2. Shop Drawings: Submit shop drawings of liquid applied membrane showing a project plan, size, relevant flashing details etc. for review and approval by the Owners Representative and Membrane Manufacturer.
 3. Warranty Documentation: Submit 2 executed copies of both the manufacturer and applicator warranties for the periods stipulated, starting from the date of the substantial completion. Each warranty must be signed by an authorized representative of the issuing company.

3.06 QUALITY ASSURANCE

2. Evaluate moisture content of substrate materials. Contractor shall determine substrate moisture content throughout the work and record with Daily Inspection Reports or other form of reporting acceptable to the Owner or designated Representative and Membrane Manufacturer.
3. Random tests to determine tensile bond strength of membrane to substrate shall be conducted by the Contractor at the job site using an adhesion tester, or by the performance of a manual pull test. Contractor shall perform tests at the beginning of the Work, and at intervals as required to assure specified adhesion with a minimum of 3 tests. Test results shall be submitted to the Owner or his designated Representative and the Membrane Manufacturer. Contractor shall immediately notify the Owner or his designated Representative and Membrane Manufacturer in the event bond test results are below specified values.
4. Adequate surface preparation will be indicated by tensile bond strength of membrane to substrate greater than or equal to 220 psi (1.5 N/mm²), as determined by use of an adhesion tester.
5. Adequate surface preparation will be indicated by peel bond strength of membrane to substrate such that cohesive failure of substrate or membrane occurs before adhesive failure of membrane/substrate interface.

3.07 SAFETY, SECURITY, OPERATIONS

2. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement.
3. Contractor shall convene a pre-installation meeting at the jobsite 1 week before starting work of this section and require attendance of parties directly affecting work of this section, including but not limited to the following:
 - a. Architect.
 - b. Engineer
 - c. Roofing/Waterproofing Consultant.
 - d. Owner's Representative.

5.00 REFERENCED STANDARDS

Most recent versions of the standards below

1. ASTM D41 - Standard Specification for Asphalt Primer Used in Roofing, Damp- proofing, and Waterproofing.
2. Underwriters Laboratories (UL): ANSI/UL 790 - Standard Test Methods of Roof Coverings.
3. ASTM D312 - Standard Specification for Asphalt Used in Roofing.
4. ASTM D471 - Standard Test Method for Rubber Property - Effect of Liquids
5. ASTM C836/C 836M - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric

PERFORMANCE SPECIFICATIONS

Waterproofing Membrane for Use with Separate Wearing Course

6. ASTM C719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)

5.00 DURABILITY

2. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers
3. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

3. Waterproofing shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.
4. Manufacturer's product Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of 10 years commencing on Date of Substantial Completion.

SECTION 1001 – PLASTERBOARD DRY LININGS, PARTITIONS & CEILINGS

1.0 GENERAL

1.01 DESCRIPTION

Plasterboard dry linings/ partitions/ ceilings incorporates the process of instilling plasterboard to for interior walls and ceilings

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install the following:

1. Plasterboard dry lining:
 - a. Interior surfaces of external walls
2. Partitions:
 - a. Instillation of internal non-load bearing walls
 - b. Walls are to provide fire resistance
3. Ceilings
 - a. Painted gypsum board ceiling

1.03 PRODUCTS

Plasterboard dry linings/ partitions/ ceilings may include a combination of the following products/ elements:

1. Gypsum boards referencing ASTM C1396 - Standard specification for gypsum boards:
 - a. Gypsum board
 - b. Type X Gypsum
 - c. Type C Gypsum
 - d. Moisture resistant Gypsum Board
2. Cement boards complying with:
 - a. ASTM C1186 – Standard specification for cement board fabrications.
3. Framing to comply with:
 - a. ASTM A1003 – Standard specification for steel sheets, carbon, metallic and non-metallic coated for cold form framing members
 - b. ASTM C754 – Standard specification for instillation of steel framing members to receive screw attached gypsum panel products
 - c. ASTM A653 – Standard specification for steel sheet, Zinc-coated (galvanized) or zinc iron alloy coated (Galvannealed) by the hot dip process
 - d. ASTM E119 – Standard test methods for fire test for building construction and materials. Fire rated for 1, 2, 3 and 4 hour rated walls.
4. Fasteners to comply with:
 - a. ASTM C1002 – Standard Specification for steel self-piercing tapping screws for application of gypsum panel products or metal plaster bases to wood studs or steel studs or ASTM C954 Standard specification for steel drill screw for the application of gypsum panel products for metal plaster bases to steel studs.

PERFORMANCE SPECIFICATIONS

5. Joint reinforcement and joint tape for fixing gypsum boards to comply with:
 - a. ASTM C475/C475M – Standard specification for joint compound and joint tape for finishing gypsum board
6. Fire, sound, thermal insulation to comply with:
 - a. ASTM C553 – Standard specification for mineral fibre blanket thermal insulation for commercial and industrial applications
 - b. ASTM C665 – Standard specification for mineral fibre blanket thermal insulation for light frame construction and manufactured housing
 - c. ASTM C726 – Standard specification for mineral wall roof insulation board
 - d. ASTM E84 – Standard test method for surface burning characteristics of building materials. Class A

2.00 APPLICATION

1. Interior wall partitions.
 - a. Partitions providing vertical separation between adjacent spaces on the interior of the building.
2. Interior surfaces of external wall.
3. Ceilings

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology

3.03 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

1. ASTM C1396 – Standard specifications for gypsum boards
2. ASTM C1186 – Standard specification for cement board fabrications
3. ASTM A1003 – Standard specification for steel sheets, carbon, metallic coated for cold form framing members
4. ASTM C754 – Standard specification for installation of steel framing members to receive screw attached gypsum panel products

PERFORMANCE SPECIFICATIONS

5. ASTM A653 – Standard specification for steel sheet, Zinc-coated (galvanized) or zinc iron alloy coated (Galvannealed) by the hot dip process
6. ASTM E119 – Standard test methods for fire test for building construction and materials. Fire rated for 1, 2, 3 and 4 hour rated walls.
7. ASTM C1002 – Standard Specification for steel self-piercing tapping screws for application of gypsum panel products or metal plaster bases to wood studs or steel studs or ASTM C954 Standard specification for steel drill screw for the application of gypsum panel products for metal plaster bases to steel studs.
8. ASTM C475/C475M – Standard specification for joint compound and joint tape for finishing gypsum board.
9. ASTM C553 – Standard specification for mineral fiber blanket thermal insulation for commercial and industrial applications
10. ASTM C665 – Standard specification for mineral fiber blanket thermal insulation for light frame construction and manufactured housing
11. ASTM C726 – Standard specification for mineral wall roof insulation board
12. ASTM E84 – Standard test method for surface burning characteristics of building materials. Class A

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage
3. Joint sealers in exterior walls: Lifespan expectancy equal to that specified for primary weather barriers.

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. Plasterboard dry linings/ partitions/ ceilings shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.

SECTION 1008 – DEMOUNTABLE SUSPENDED CEILINGS

1.0 GENERAL

1.01 DESCRIPTION

Demountable suspended ceilings incorporates grid ceiling systems that are used in conjunction with suspended ceiling systems.

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install the following:

1. Interior ceiling treatments
2. Suspended ceiling systems

1.03 PRODUCTS

Demountable suspended ceiling may include a combination of the following products/ elements:

1. Interior ceiling treatment in compliance with:
 - a. ASTM E1264 – Standard classification for acoustical ceiling products
 - b. ASTM C1396 – Standard specification for gypsum boards
2. Suspended ceiling framing in compliance with:
 - a. ASTM C635 – Standard specification for manufacture, performance and testing of metal suspension systems for acoustical tile and lay-in panel ceilings.
 - b. ASTM G30 – Standard specifications for making and using u-bend stress-corrosion test specimens
 - c. ASTM A153 – Standard specification for zinc coating (hot-dip) on iron and steel hard wear
 - d. ASTM A653 – Standard specification for steel sheet, zinc-coated (galvanized) or zinc-iron alloy-coated (galvannealed) by the hot-dip process
 - e. ASTM E119 – Standard test methods for fire test for building construction and materials. Fire rated for 1, 2, 3 and 4 hour rated walls.
3. Fire, sound, thermal insulation in compliance with:
 - a. ASTM C553 – Standard specification for mineral fibre blanket thermal insulation for commercial and industrial applications

2.00 APPLICATION

1. Ceiling.

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology

3.04 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

1. ASTM E1264
2. ASTM C635
3. ASTM G30
4. ASTM A153
5. ASTM A653
6. ASTM C553

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. Demountable suspended ceilings shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.
2. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of 15 years commencing on Date of Substantial Completion.

SECTION 1101 – WINDOWS, ROOFLIGHTS, SCREENS & LOUVERS

1.0 GENERAL

1.01 DESCRIPTION

Windows / roof lights / screens / louvers incorporates wall openings and features / accessories that provide light and airflow while retaining the structure's profile.

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install the following:

1. Windows:
2. Roof lights
3. Screens
4. Louvers

1.03 PRODUCTS

Windows / roof lights / screens / may include a combination of the following products/ elements:

1. Exterior windows and structural elements to comply with:
 - a. ASTM E2112: Standard practice for installation of exterior windows, doors and skylights.
 - b. ASTM F2912: Standard specifications for glazing and glazing system subject to air blast loading.
 - c. ASTM E1105: Standard test method for fire determination of water penetration of installed exterior windows, skylights, doors and curtail walls, by uniform or cyclic static air pressure difference
2. Framing to comply with:
 - a. ASTM E2112: Standard practice for installation of exterior windows, doors and skylights.
3. Louvers to comply with:
 - a. ASTM E1886: Standard test method for performance of exterior windows, curtain walls, doors and impact protective system impacted by missile(s) and exposed to cyclic pressure differentials.
 - b. ASTM E1996: Standard specification for performance of exterior windows, curtain walls, doors and impact protective systems impacted by windborne debris in hurricanes.
4. Screening to comply with:
 - a. ASTM D3656 / D3656M: Standard specification for insect screening and louver cloth woven from vinyl – coated glass yarns
5. Fire, sound and thermal control to comply with:
 - a. ASTM E119 – Standard specification for fire tests of building construction and materials

2.00 APPLICATION

1. Specified exterior walls openings.
2. Specified roof openings
3. Ceilings
4. Window treatments

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology
3. Window schedule

3.05 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

1. ASTM E2112
2. ASTM F2912
3. ASTM E1105
4. ASTM E1886
5. ASTM E1996
6. ASTM D3656 /D3656M
7. ASTM E119

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage
3. Joint sealers in exterior walls: Lifespan expectancy equal to that specified for primary weather barriers.

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. Windows / roof lights / screens / louvers shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.
2. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of 15 years commencing on Date of Substantial Completion for the window frames and for a minimum of 5 years for laminated glass and window hardware.

SECTION 1102 – DOORS / SHUTTERS / HATCHES

1.0 GENERAL

1.01 DESCRIPTION

1. The elements comprising doors/ shutters/ hatches includes the aforementioned items of all sizes and uses and elements that form or complete the openings, unless they are an integral part of another element.

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install the following:

1. Internal Doors
2. External Doors
3. Internal doors with glazed vision panels
4. External doors with glazed vision panels
5. Internal Door Frames
6. External Door Frames
7. Shutters
8. Hatches

1.03 PRODUCTS

Doors / Shutters / Hatches may include a combination of the following products/ elements:

1. Internal and external doors shall comprised of galvanized steel and shall comply with:
 - a. ANSI A250.8 – Standard Specification for Standard Steel doors and Frames (SDI-100)
 - b. ASTM A879 – Standard specification for steel sheet, zinc coated by the electrolytic process for applications requiring designation of the coating on each surface.
 - c. ASTM E2112 (19c) – Standard practice for instillation of exterior windows, doors and skylight
2. Frames shall be galvanized steel and shall comply with:
 - a. ANSI A250.8 – Standard Specification for Standard Steel doors and Frames (SDI-100)
3. Glazed Vision Panels:
 - a. Doors shall consist of glazed vision panels where appropriate based on user requirements
4. Hatches:
 - a. ASTM C1802 (20) – Standard specification for design, testing, manufacture, selection, and installation of horizontal fabricated metal access hatches for utility, water and wastewater structures
5. Security:
 - a. ASTM E2395 (18) – Standard specification for voluntary security performance of window and door assemblies with glazing impact
6. Fire resistance:
 - a. ASTM E119 (20) – Standard test method for fire test of building construction and materials
 - b. NFPA 252 or UL 10B – Ratings for fire walls and fire doors
7. Weather resistance:
 - a. ASTM E1996(20) – Standard for performance of exterior windows, curtain walls, door and impact protective system impacted by windborne debris in hurricanes
 - b. ASTM E115(15) – Standard test method for field determination of water penetration of installed exterior windows, skylights, doors and curtain walls, by uniform cyclic static air pressure difference

2.00 APPLICATION

PERFORMANCE SPECIFICATIONS

1. Exterior doors
2. Interior doors
3. Overhead / ceiling access
4. Underground access

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology

3.06 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

2. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

1. ASTM E 2112(19C)
2. ANSI/SDI A250.8
3. ASTM A879
4. ASTM C1802 (20)
5. ASTM E2395 (18)
6. ASTM E119 (20)
7. NFPA 252 IR UL 10B
8. ASTM E1996 (20)

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage
3. Joint sealers in exterior walls: Lifespan expectancy equal to that specified for primary weather barriers.

6.0 WARRANTIES, GUARANTEES AND MAINTENANCE

1. Doors / Shutters / Hatches shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.
2. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by

PERFORMANCE SPECIFICATIONS

authorized company official for a minimum of 5 years commencing on Date of Substantial Completion.

SECTION 1104 –STAIRS/ RAMPS/ HANDRAIL & GUARD RAILS

1.0 GENERAL

1.01 DESCRIPTION

This section includes devices for connecting various building levels (stairs & ramps) and the protection and guidance systems (rails & guards) associated with these devices.

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install the following:

1. External Stairs
2. Internal Stairs
3. External Ramps
4. Internal Ramps
5. Handrails
6. Guard Rails

1.03 PRODUCTS

This section may include a combination of the following products/ elements:

1. Internal & External Stairs
 - a. Cast in place treads and landings shall comply with the standards set out in Section 501 “In situ & Precast Concrete”
 - b. Precast treads & landings shall comply with the standards set out in Section 501 “In situ & Precast Concrete”
 - c. Steel stairs and landings
 - i. Exposed surfaces shall be free of seam marks, rolled names, and other irregularities.
 - ii. Steel shapes shall comply with ASTM A36 - Standard specification for carbon structural steel.
 - iii. Steel Sheets shall comply with ASTM A1008 – Standard specification for cold rolled structural steel.
 - iv. Galvanized Steel Sheets shall comply with ASTM A653 – Standard specification for steel sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip process.
 - v. External stairs shall be fabricated to shed water and provide weep holes where water may accumulate
 - d. External stairs shall be fabricated to shed water and provide weep holes where water may accumulate
2. Internal & External Ramps
 - a. Cast in place ramps and landings shall comply with the standards set out in Section 501 “In situ & Precast Concrete”
 - b. Precast concrete ramps & landings to comply with the standards set out in Section 501 “In situ & Precast Concrete”
 - c. Steel framed ramps and landings
 - i. Exposed surfaces shall be free of seam marks, rolled names, and other irregularities.
 - ii. Steel shapes shall comply with ASTM A36 - Standard specification for carbon structural steel.
 - iii. Steel Sheets shall comply with ASTM A1008 – Standard specification for cold rolled structural steel.

PERFORMANCE SPECIFICATIONS

- iv. Galvanized Steel Sheets shall comply with ASTM A653 – Standard specification for steel sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip process.
 - v. External ramps shall be fabricated to shed water and provide weep holes where water may accumulate
- 3. Metal railings
 - a. Hand rails & Guard rails
 - i. Exposed surfaces shall be free of seam marks, rolled names, and other irregularities.
 - ii. Steel shapes shall comply with ASTM A36 - Standard specification for carbon structural steel.
- 4. Concrete railings
 - a. Hand rails & Guard rails shall comply with the standards set out in Section 501 “In situ & Precast Concrete”
- 5. Fasteners
 - a. Post-Installed Anchors/ chemical anchors shall comply with ASTM E1512 – Standard test methods for testing bond performance of Bonded anchors
 - b. Stainless steel fasteners shall comply with ASTM F593 – Standard specification for stainless steel bolts, hex cap screws and studs.
 - c. Connection Bolts shall comply with ASTM A307 – Standard specification for carbon steel bolts, studs and threaded rod 60,000 PSI Tensile strength,
 - d. Steel Nuts shall comply with ASTM A563 – Standard specification for carbon and Alloy Steel Nuts
- 6. Finishes
 - a. Primer to be applied to all surfaces except those to be field welded or embedded in concrete.
 - b. A second coat of primer is to be applied to surfaces that will be concealed when installed, and to bolts and welds.
 - c. Galvanizing is to comply with ASTM A153 – Standard specification for Zinc coating (Hot-dip) on iron and steel hardware and ASTM A123 – Standard specification for Zinc (Hot-dip galvanized) coatings on Iron and steel products.

2.00 APPLICATION

- 1. External walking surfaces connecting various levels
- 2. Internal walking surfaces connecting various building floors/ levels
 - a. Partitions providing vertical separation between adjacent spaces on the interior of the building.
- 3. Protection for open stair, ramp or landing edges above 762mm (30”)

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

- 1. Materials listing and certification indicating that products adhere to standard specifications.
- 2. Installation methodology
- 3. Shop Drawings: Plans, sections, elevations, details, attachments
- 4. Certificates
 - a. Welding qualifications
 - b. Paint compatibility

PERFORMANCE SPECIFICATIONS

- c. Mill certificates
- d. Test certificates ensuring code compliance of steel and anchors

3.07 QUALITY ASSURANCE

- 1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
- 2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
- 3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

- 1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

4.01 ACCESSIBILITY REQUIREMENTS

- 1. The components detailed in this section shall comply with the accessibility standards of the ICC/ ANSI A117.1 - Accessible and Usable buildings and Facilities Standard

4.02 SEISMIC REQUIREMENTS

- 1. The design of elements in this section shall comply with the requirements of ASCE / SEI 7.

4.03 INTERNATIONAL BUILDING CODE (IBC) REFERENCES

- 1. The design of elements in this section shall comply with the requirements the IBC generally paying particular attention to the comply withing:
 - a. Section 1007 – Accessible means of egress
 - b. Section 1009 – Stairs
 - c. Section 1010 – Ramps
 - d. Section 1012 – Handrails
 - e. Section 1013 – Guards

4.04 ASTM STANDARDS

- 1. ASTM A36
- 2. ASTM A1008
- 3. ASTM A653
- 4. ASTM E1512
- 5. ASTM F593
- 6. ASTM A563
- 7. ASTM A153 and ASTM A123

5.00 DURABILITY

- 1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic
- 2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. Stairs/ Ramps/ Handrail & Guardrails shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.

SECTION 1105 – BURGLAR PROOFING AND GRILLEWORK

1.0 GENERAL

1.01 DESCRIPTION

The erection of grillwork and gates to secure the doors and windows, access and egress points of the perimeter of the building.

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install the following works:

1. Gates
2. Decorative grillwork

1.03 PRODUCTS

The fencing works may include a combination of the following products/ elements:

1. Gates shall include the properties detailed for and must provide a gate width appropriate to the use (pedestrian access).
2. Metal grillwork gates shall include the following properties:
 - a. Exposed surfaces shall be free of seam marks, rolled names, and other irregularities.
 - b. Steel shapes shall comply with ASTM A36 - Standard specification for carbon structural steel.
 - c. Coatings on the iron/ steel shall comply with ASTM A123 – Standard specification for Zinc (Hot-dip galvanized) coatings on Iron and steel products.
3. Decorative Grillwork shall include the following properties:
 - a. Exposed surfaces shall be free of seam marks, rolled names, and other irregularities.
 - b. Steel shapes shall comply with ASTM A36 – Standard specification for carbon structural steel.
 - c. Coatings on the iron/ steel shall comply with ASTM A123 – Standard specification for Zinc (Hot-dip galvanized) coatings on Iron and steel products.

2.00 APPLICATION

1. Masonry boundary walls
2. “Anti-climb” medium security perimeter fencing
3. “Anti-climb” medium security perimeter fencing gates
4. Grillwork (burglar proof) gates providing access to the building through the door masonry openings on perimeter building walls and/or the verandah perimeter grillwork.
5. Decorative grillwork (burglar proofing) panels along open air verandah perimeters.
6. Decorative grillwork (burglar proofing) panel inserts in window openings.

3.00 REFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

PERFORMANCE SPECIFICATIONS

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology

3.08 QUALITY ASSURANCE

4. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
5. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
6. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

3. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

2.00 REFERENCED STANDARDS

1. ASTM A153– Standard specification for Zinc coating (Hot-dip) on iron and steel hardware
2. ASTM A123 – Standard specification for Zinc (Hot-dip galvanized) coatings on Iron and steel products
3. ASTM A36 – Standard specification for carbon structural steel

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage
3. Joint sealers: Lifespan expectancy equal to that specified for primary weather barriers.

6.0 WARRANTIES, GUARANTEES AND MAINTENANCE

2. Grillwork (Burglarproofing) shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.

SECTION 1205 – PLASTERED, RENDERED, ROUGHCAST COATING

1.0 GENERAL

1.01 DESCRIPTION

Plastered, rendered, roughcasting coating incorporates coarse finishing materials that hardens while drying and are applied to wall or ceilings for aesthetic purposes or as weather protection.

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install plastered, rendered or roughcast coatings on the following surfaces:

1. Exterior walls
2. Interior walls
3. Exterior ceilings
4. Interior ceilings
5. Interior partitions

1.03 PRODUCTS

Plastered, rendered, roughcasting coating may include a combination of the following products/ elements:

1. Lime in compliance with:
 - a. ASTM C25 – Test methods for chemical analysis of limestone, quicklime and hydrated lime
 - b. ASTM C206-14 – Standard specification for finishing hydrate lime
2. Portland Cement in compliance with:
 - a. ASTM C150/C150M-20 Standard specification for Portland cement
 - b. ASTM C926 – Standard specification for application of Portland cement based plaster
3. Aggregate in compliance with:
 - a. ASTM C35 – Specification for inorganic aggregates for use in gypsum plaster
 - b. ASTM C897 - Standard specification for aggregate job-mixed Portland cement-based plasters
4. Plaster Mix in compliance with:
 - a. ASTM C1157 – Standard performance specification for hydraulic cement
 - b. ASTM C260 – Specification for blended hydraulic cement
 - c. ASTM C91 – Standard specification for masonry cement
5. Partitions in compliance with:
 - a. ASTM C59/C59M – Standard specifications for gypsum casting plaster and gypsum molding plaster
 - b. ASTM C595 – Specifications for bonding compounds for interior gypsum plastering
 - c. ASTM C932 – Specifications for surface-applied bonding compounds for exterior plastering
 - d. ASTM C631 – Specification for bounding compounds for interior gypsum plastering
6. Fire, thermal and sound insulation in compliance with:
 - a. ASTM E119 - Test methods for fire tests building materials
 - b. ASTM E90 – Test methods for laboratory measurement of airborne sound transmission of building partitions and elements

2.00 APPLICATION

1. Interior surfaces
 - a. Walls
 - b. Partitions
 - c. Ceilings
2. Exterior surfaces
 - a. Walls
 - b. Ceilings

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology

3.09 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

1. ASTM C25
2. ASTM C206-14
3. ASTM C150M-20
4. ASTM C926
5. ASTM C1157
6. ASTM C260
7. ASTM C91
8. ASTM C59
9. ASTM C595
10. ASTM C932
11. ASTM C631
12. ASTM E119
13. ASTM E90

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. Plastered, rendered and roughcast coatings shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.

SECTION 1209 – STONE, CONCRETE, QUARRY, CERAMIC & MOSAIC TILING

1.0 GENERAL

1.01 DESCRIPTION

1. Stone incorporates natural material used aesthetically as surface finishes.
2. Concrete handmade tile primarily used as decorative floor finishes
3. Quarry construction tile made of natural clays commonly ½" to ¾" thick
4. Ceramic tiling
5. Mosaic

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install plastered, rendered or roughcast coatings on the following surfaces:

1. Walls
2. Floors

1.03 PRODUCTS

Stone / concrete / quarry / ceramic tiling / mosaic may include a combination of the following products/elements:

1. ASTM C503 – Standard specifications for marble dimension stone
2. ASTM C126 – Standard specification for ceramic glazed structural clay facing tile, facing brick and solid masonry units
3. ANSI A137.1 – Standard specification for ceramic tile
4. ASTM C1670 – Standard specifications for adheres manufactured stone masonry veneer units

2.00 APPLICATION

1. Exterior floor surfaces
2. Interior floor surfaces
3. Exterior wall surfaces
4. Interior wall surfaces

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology

3.10 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will

3.03 SAFETY, SECURITY, OPERATIONS

- ## 4.00 REFERENCED STANDARDS

- ## 5.00 DURABILITY

- ## 6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

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SECTION 1212 – RUBBER / PLASTIC / CORK / LINOLEUM / CARPET TILING / SHEETING

1.0 GENERAL

1.01 DESCRIPTION

This section incorporates flooring finishes consisting of synthetic and natural materials as an alternative to traditional floor finishing, providing durability, longevity once maintained properly

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install the following types of flooring:

1. Rubber
2. Plastic
3. Cork
4. Linoleum
5. Carpet tiling
6. Sheeting
7. Vinyl sheet flooring
8. Luxury vinyl tiles (LVT) flooring

1.03 PRODUCTS

Rubber / plastic / cork / lino / carpet tiling / sheeting may include a combination of the following products/elements:

1. Rubber flooring:
 - a. ASTM F1859 – Standard specification for rubber sheet floor covering without backing
 - b. ASTM F1860 – Standard specification for rubber sheet floor covering with backing
 - c. ASTM F2041 – Standard specification for bonded rubber crumb floor coverings
2. Cork Flooring:
 - a. ASTM F3008 – Standard specification for cork floor tile
3. Lino (linoleum) flooring:
 - a. ASTM F2195 – Standard specification for linoleum floor tile
4. Luxury vinyl flooring
 - a. ASTM F1066 – Standard specification for vinyl composition floor tile
 - b. ASTM F1700 – Standard specification for solid vinyl floor tile
 - c. ASTM F3261 – Standard specification for resilient flooring in modular format with rigid polymeric core
 - d. ASTM F386 – Standard test method for thickness of resilient flooring material having flat surfaces
 - e. ASTM F1514 – Standard test method for measuring heat stability of resilient flooring by colour change
5. Vinyl sheet flooring
 - a. ASTM F1303 – Standard specification for sheet vinyl floor covering with backing
 - b. ASTM F1913 – Standard specification for vinyl sheet floor covering without backing

2.00 APPLICATION

1. Flooring pertaining to this project me include the following common areas of application:
 - a. Auditorium
 - b. Staff room / offices

PERFORMANCE SPECIFICATIONS

- c. Kitchen
- d. Restrooms
- e. Dressing rooms
- f. Classrooms
- g. Day care
- h. Intermediate areas not mentioned

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology

3.11 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

1. ASTM F1859
2. ASTM F1860
3. ASTM F2041
4. ASTM F3008
5. ASTM F2195
6. ASTM F1066
7. ASTM F1700
8. ASTM F3261
9. ASTM F386
10. ASTM F1514
11. ASTM F1303
12. ASTM F1913

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage
3. Joint sealers in exterior walls: Lifespan expectancy equal to that specified for primary weather barriers.

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

PERFORMANCE SPECIFICATIONS

2. Rubber / plastic / cork / lino / carpet tiling / sheeting shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.
3. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of 10 years commencing on Date of Substantial Completion.

SECTION 1215 – PAINTING / CLEAR FINISHING

1.0 GENERAL

1.01 DESCRIPTION

Painting / Clear Finishing incorporates the application of stain, paint or thin coating as the final finish or layer of protection to various surfaces as instructed.

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to paint/ clear finish the following surfaces:

1. Exterior wooden surfaces
2. Interior wooden surfaces
3. Exterior masonry surfaces
4. Interior masonry surfaces
5. Exterior partitions (cement board)
6. Interior partitions (gypsum/ cement board)
7. Interior rendered/ plastered or roughcast surfaces
8. Exterior rendered/ plastered or roughcast surfaces
9. Interior Ceilings
10. Exterior Ceilings
11. Exterior metal surfaces
12. Interior metal surfaces

1.03 PRODUCTS

Painting / Clear Finishing may include a combination of the following products/ elements:

1. Paint arrangements:
 - a. Paint
 - b. Undercoats
 - c. Primers
 - d. Varnish stains
 - e. Polyurethane lacquers
 - f. Emulsion paints
2. All paint arrangements detailed above shall be digitally mixed as specified by the employer
3. Manufacturers' quality control: sample testing may be engaged by the client/architect.

2.00 APPLICATION

1. Interior, exterior wood work surfaces
 - a. Cabinetry
 - b. Partitions
 - c. Joinery
2. Interior, exterior masonry surfaces
 - a. Brick
 - b. Stone
 - c. Plastered / rendered materials
 - d. Stucco
 - e. Concrete
3. Interior/ exterior metal surfaces.

PERFORMANCE SPECIFICATIONS

- a. Aluminium
- b. Iron
- c. Steel
- d. Copper

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology

3.12 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

1. All paint works shall be in compliance with the guidelines of the latest version of the Painting Contractors Association (PDCA) Industry Standards.

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage
3. Joint sealers in exterior walls: Lifespan expectancy equal to that specified for primary weather barriers.

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. Painting and clear finishing shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.
2. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of 10 years commencing on Date of Substantial Completion.

SECTION 1301 – MOVABLE FURNITURE

1.00 GENERAL

1.01 DESCRIPTION

9. This section includes commercial grade furniture that can be moved around and adapted easily. It is designed to work within a space by providing functionality that can meet the current and future needs of the building's occupants and includes the following:
 - a. All furniture, necessary fittings and configurations required for the occupancy and use of the facility and its proposed functions.
 - b. All furniture, necessary fittings and configurations required as specified by the user requirements, the International Building Code (IBC) 2015 and/ or by the local Authority Having Jurisdiction (AHJ).

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install the following movable furniture:

- 1 Office Chairs
- 2 Lounge and public seating
- 3 Desks
- 4 Panel Systems
- 5 Tables
- 6 Storage & Filing

1.03 PRODUCTS

This section may include a combination of the following products/ elements:

7. Office Chairs
 - a. Chairs shall be of one or more of the following categories:
 - i. Task Chairs
 - ii. Guest Chairs
 - b. Chairs shall comprise of one or more of the following properties:
 - i. Office chairs in compliance with the quality standards of ANSI/BIFMA X5.1
 - ii. Weight capacity of minimum 275lbs without loss of performance
 - iii. Seating fabrics complying with the Martindale abrasion rub test and should achieve score of 40,000 or more - heavy duty commercial grade upholstery
 - iv. Furniture Sustainability Standard at a minimum ANSI/BIFMA e3 – level 1
 - v. Available fabric choices which meet MBDC Cradle-to-Cradle Gold sustainable design certification - fabrics contain less than 100 parts per million of any heavy metals of concern, which includes antimony, which is traditionally found in polyester fabrics.

- vi. Painted components - coated with powder coat paint.

8. Lounge & Public seating

- a. Lounge and public seating shall be of one or more of the following categories:
 - i. Sofas
 - ii. Lounge Chairs
 - iii. Reception chairs
 - iv. Dining Chairs
 - v. Nesting Chairs
 - vi. Stacking Chairs
- b. Lounge and public seating shall comprise of one or more of the following properties:
 - i. Lounge and public seating in compliance with the quality standards of ANSI/BIFMA X5.4
 - ii. Weight capacity of minimum 270 lbs without loss of performance
 - iii. Seating fabrics complying with the Martindale abrasion rub test and should achieve score of 40,000 or more - heavy duty commercial grade upholstery
 - iv. Furniture Sustainability Standard at a minimum ANSI/BIFMA e3 – level 1
 - v. Available fabric choices which meet MBDC Cradle-to-Cradle Gold sustainable design certification - fabrics contain less than 100 parts per million of any heavy metals of concern, which includes antimony, which is traditionally found in polyester fabrics.
 - vi. Painted components - coated with powder coat paint.
 - vii. Solid wood components - termite treated hardwoods, non-porous, resistant to rot, chips, scratches and dents.

9. Desks

- a. Desks shall be of one or more of the following categories:
 - i. Desks
 - ii. Workstations
 - iii. Student Desks
- b. Desks shall comprise of one or more of the following properties:
 - i. Desks in compliance with the quality standards of ANSI/BIFMA X5.5
 - ii. Furniture Sustainability Standard at a minimum ANSI/BIFMA e3 – level 1
 - iii. Painted components - coated with powder coat paint.
 - iv. Solid wood components - termite treated hardwoods, non-porous, resistant to rot, chips, scratches and dents.
 - v. Minimum 1" (25.4mm) thick MDF or HDF laminated top
 - vi. Plastic or woodgrain laminate shall be 1.22mm thick by 'Wilsonart' / Arborite (or equal and approved by Architect).
 - vii. Fire-Rated Laminate must be bonded to a substrate of reliable quality and appropriate fire rating, such as particleboard, incombustible cement board or plywood with one A-face. Bond with adhesives, and follow the techniques recommended by the adhesive manufacturer.

- viii. Laminate with scratch and mold resistance and NEMA tested surface wear of min 400 cycles.
- ix. Laminate with a minimum Class B minimum fire rating.

10. Panel Systems

- a. Panel systems shall be of one or more of the following categories:
 - i. Privacy Panels
 - ii. Vision Panels
 - iii. Modesty Panels
 - iv. Electrified Panels
 - v. Cable Management
 - vi. Room dividers and partitions
- b. Panel systems shall comprise of one or more of the following properties:
 - i. Panel systems in compliance with the quality standards of ANSI/BIFMA X5.6
 - ii. Furniture sustainability standard at a minimum ANSI/BIFMA e3 – level 1
 - iii. Painted components - coated with powder coat paint.
 - iv. Solid wood components - termite treated hardwoods, non-porous, resistant to rot, chips, scratches and dents.
 - v. Plastic or woodgrain laminate shall be 1.22mm thick by 'Wilsonart' / Arborite (or equal and approved by Architect).
 - vi. Fire-Rated Laminate must be bonded to a substrate of reliable quality and appropriate fire rating, such as particleboard, incombustible cement board or plywood with one A-face. Bond with adhesives, and follow the techniques recommended by the adhesive manufacturer.
 - vii. Laminate with scratch and mold resistance and NEMA tested surface wear of min 400 cycles.
 - viii. Laminate with a minimum Class B minimum fire rating.
 - ix. Frosted or clear acrylic panels min 4mm thick with metal framed edges
 - x. Frosted or clear toughened safety glass min 4mm thick with metal framed edges
 - xi. Electrified panels in compliance with the standards of the Underwriters Laboratory (UL).

11. Tables

- a. Tables shall be of one or more of the following categories:
 - i. Meeting Tables
 - ii. Dining Tables
 - iii. Side Tables
 - iv. Coffee Tables
 - v. Folding/ Nesting Tables
- b. Tables shall comprise of one or more of the following properties:
 - i. Tables in compliance with the quality standards of ANSI/BIFMA X5.5
 - ii. Furniture Sustainability Standard at a minimum ANSI/BIFMA e3 – level 1
 - iii. Painted components - coated with powder coat paint.

- iv. Solid wood components - termite treated hardwoods, non-porous, resistant to rot, chips, scratches and dents.
- v. Minimum 1" (25.4mm) thick MDF or HDF laminated top
- vi. Plastic or woodgrain laminate shall be 1.22mm thick by 'Wilsonart' / Arborite (or equal and approved by Architect).
- vii. Fire-Rated Laminate must be bonded to a substrate of reliable quality and appropriate fire rating, such as particleboard, incombustible cement board or plywood with one A-face. Bond with adhesives, and follow the techniques recommended by the adhesive manufacturer.
- viii. Laminate with scratch and mold resistance and NEMA tested surface wear of min 400 cycles.
- ix. Laminate with a minimum Class B minimum fire rating.

12. Storage & Filing

- a. Storage & Filing shall be of one or more of the following categories:
 - i. Lateral filing cabinets
 - ii. Vertical filing Cabinets
 - iii. Storage Shelves
 - iv. Storage Cabinets
 - v. Storage lockers
 - vi. Bedside storage cabinets
- b. Storage and filing shall comprise of one or more of the following properties:
 - i. Storage and filing in compliance with the quality standards of ANSI/BIFMA X5.9
 - ii. Furniture Sustainability Standard at a minimum ANSI/BIFMA e3 – level 1
 - iii. Painted components - coated with powder coat paint.
 - iv. Flush mounted doors with 180 degree opening capacity.
 - v. Lockable doors
 - vi. Minimum 18 gauge steel construction
 - vii. Availability in a wide range of colours to be confirmed by the employer.

2.00 APPLICATION

1. To provide all furniture, necessary fittings and configurations required for the occupancy and use of the facility and its proposed functions in the configurations required as specified by the user requirements, the International Building Code (IBC) 2015 and/ or by the local Authority Having Jurisdiction (AHJ).

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology

3. Specification/ Cut Sheets

3.13 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.14 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

4.01 INTERNATIONAL BUILDING CODE (IBC) REFERENCES

1. The design of elements in this section are to comply with the requirements the IBC 2015 generally paying particular attention to the following:
 - f. Chapter 11 – Accessibility

4.02 ACCESSIBILITY STANDARDS

1. Components of the design requiring accessibility are to comply with the standards of the ICC/ ANSI A117.1 - Accessible and Usable buildings and Facilities Standard

4.03 STANDARD SPECIFICATIONS

1. ANSI/BIFMA X5.1 – Office chairs
2. ANSI/BIFMA X5.4 – Lounge & Public seating
3. ANSI/BIFMA X5.5 – Desks & Tables
4. ANSI/BIFMA X5.6 – Panel systems
5. ANSI/BIFMA X5.9 – Storage & Filing

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

3. All movable furniture shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.
4. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of 8 years commencing on Date of Substantial Completion for the movable furniture detailed in this section. Also provide warranties as follows for the elements described below:
 - a. Laminates and wood veneers shall have a minimum 12 year warranty.
 - b. Modular power components shall have a minimum 12 year warranty.
 - c. Vertical surface textiles shall have a minimum 12 year warranty.

SECTION 1304 –SANITARY APPLIANCES & FITTINGS

1.0 GENERAL

1.01 DESCRIPTION

This section includes plumbing fixtures comprising of the following:

1. All fixtures necessary for the sanitation, occupancy and use of the facility connected to the water supply and/or drainage
2. Fixtures required as specified by the user requirements, the International Building Code (IBC) and/ or by the local Authority Having Jurisdiction (AHJ).

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install the following sanitary appliances and fittings:

1. Water Closets
2. Urinals
3. Lavatories
4. Accessible washroom fixtures
5. Kitchen sinks
6. Faucets and trims
7. Drinking Fountains
8. Utility/ Mop/ Janitor's Sinks

1.03 PRODUCTS

This section may include a combination of the following products/ elements:

1. Water Closets shall comprise of one or more of the following properties:
 - a. Vitreous china that complies with BS 3402:1969 – Specification for quality of vitreous china sanitary appliances
 - b. Floor mounted fixtures
 - c. Wall mounted fixtures
2. Urinals
 - a. Vitreous china that complies with BS 3402:1969 – Specification for quality of vitreous china sanitary appliances
 - b. Wall mounted fixtures
3. Lavatories
 - a. Vitreous china that complies with BS 3402:1969 – Specification for quality of vitreous china sanitary appliances
 - b. Countertop mounted fixtures
 - c. Under-counter mounted fixtures
 - d. Pedestal mounted fixtures
4. Accessible washroom fixtures
 - a. Toilets/ toilet compartments and all fixtures, fittings and accessories contained therein required by specific user requirements or as guided by the International Building Code shall conform to ICC/ ANSI A117.1 - Accessible and Usable buildings and Facilities Standard
5. Kitchen sinks
 - a. Stainless steel that complies with ASTM A240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet And Strip For Pressure Vessels And For General Applications
 - b. Countertop mounted fixtures

PERFORMANCE SPECIFICATIONS

- c. Under-counter mounted fixtures
- 6. Faucets and trims
 - a. Polished chrome – plated finish
 - b. Satin nickel – plated finish
 - c. Brushed stainless steel finish
- 7. Utility/ Mop/ Janitor's Sinks
 - a. Stainless steel that complies with ASTM A240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet And Strip For Pressure Vessels And For General Applications
 - b. Vitreous china that complies with BS 3402:1969 – Specification for quality of vitreous china sanitary appliances
 - c. Wall mounted fixture
 - d. Floor mounted fixture

1.04 DESIGN CRITERIA

- 1. Fixture Functions
 - a. Lavatories shall have a standard spout with integral overflow
 - b. Urinals shall have a siphon jet flushing actions
 - c. Kitchen sinks shall have a swivel spout and water spray nozzle
- 2. Fixture installation is to be in compliance with IPC Section 405 – Installation of fixtures
- 3. Water Consumption
 - a. Shall be in compliance with table 604.4 of the International Plumbing code (IPC) which indicates the “Maximum Flow Rates for Plumbing Fixtures and Fittings”

2.00 APPLICATION

- 1. To provide plumbing fixtures necessary for occupancy, use and sanitation of the facility as specified by the user requirements, the International Building Code (IBC) and/ or by the local Authority Having Jurisdiction (AHJ).

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

- 1. Materials listing and certification indicating that products adhere to standard specifications.
- 2. Installation methodology
- 3. Specification/ Cut Sheets

3.15 QUALITY ASSURANCE

- 1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
- 2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
- 3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

- 1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

4.01 INTERNATIONAL BUILDING CODE (IBC) REFERENCES

1. The design of elements in this section are to comply with the requirements the IBC generally paying particular attention to the following:
 - a. Chapter 29 – Plumbing Systems

4.02 INTERNATIONAL PLUMBING CODE (IPC) REFERENCES

1. The design is to comply with the standards of the International Plumbing Code (IPC) generally paying particular attention to the following:
 - a. IPC Section 405 – Installation of fixtures
 - b. IPC table 604.4 - Maximum Flow Rates for Plumbing Fixtures and Fittings

4.04 ACCESSIBILITY STANDARDS

1. Components of the design requiring accessibility are to comply with the standards of the ICC/ ANSI A117.1 - Accessible and Usable buildings and Facilities Standard

4.05 STANDARD SPECIFICATIONS

1. BS 3402:1969
2. ASTM A240

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. All sanitary appliances shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.
2. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of 10 years commencing on Date of Substantial Completion for the sanitary appliances and fittings detailed in this section.

SECTION 1305 – INTERNAL SIGNAGE

2.0 GENERAL

1.01 DESCRIPTION

- A. It is the intent of these specifications to establish a sign standard for the Owner including but not limited to, wall-mounted directional signs, primary room identification, restrooms, conference rooms and all code compliant Braille signage.
- B. Comply with all applicable provisions of the 2010 ADA Standard for Accessible Design codes that apply to the State and Local jurisdiction of the project.
- C. If required text and graphics are not indicated in specification or on drawings, obtain Owner's instructions as to text and graphics prior to preparation of shop drawings.
- D. Typography: See Drawings. Copy shall be a clean and accurate reproduction of typeface(s) specified. Upper and lower case and all caps as indicated in Sign Type drawings and Signage Schedule. Letter spacing to be set by manufacturer.
- E. Arrows, symbols, and pictograms will be provided in style, sizes, colors and spacing as indicated in drawings for each sign system.
- F. Braille: Grade 2

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install one or more of the following:

1. Room Identification
2. Stairs
3. Restroom
4. Elevator Lobby
5. Informational Signage
6. Directory Signage
7. Plastic exterior panel signs
8. Room Identification
9. Stairs
10. Restroom
11. Elevator Lobby
12. Informational Signage
13. Directory Signage

1.03 PRODUCTS

- B. This section may include a combination of the following products/ elements:
1. Comply with all applicable provisions of the 2010 ADA Standard for Accessible Design.
 2. Character Proportion: Letters and numbers on signs must have a width-to-height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10.
 3. Color Contrast: Characters and symbols must contrast with their background - either light characters on a dark background or dark characters on a light background.
 4. Raised Characters or Symbols: Letters and numbers on signs must be raised 1/32 in (0.8 mm) minimum. Raised characters or symbols must be at least 5/8 in (16 mm) high but no higher than 2 in (50 mm). Symbols or pictograms on signs must be raised 1/32 in (0.8 mm) minimum.
 5. Symbols of Accessibility: Accessible facilities required to be identified must use the international symbol of accessibility.
 6. Braille: Grade II with accompanying text.
- C. Fire Performance Characteristics:
1. Provide photopolymer signage with surface burning characteristics that consist of a flame spread of 75 and a smoke development of 120 when tested in accordance with UL 723 (ASTM E 84).
 2. Self-Extinguishing: Provide photopolymer signage with a CC1 classification for .060 in thick material when tested in accordance with the procedures in ASTM D 635, Standard Test Method for Rate of Burning and/or Extent and Time of Burning Plastics in a Horizontal Position.
 3. Vertical Burn: Provide photopolymer material that is classified as 94V-2 for material .118 in thick or greater and 94HB for material .118 in thick or less when tested in accordance with UL 94, Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
 4. Self-Ignition Temperature: Provide photopolymer material that has a self-ignition temperature of 800 degrees F (427 degrees C) when tested in accordance with ASTM D 1929.

2.00 APPLICATION

2. External building signage as specified by the user requirements, and in keeping with the requirements of the local Authority Having Jurisdiction (AHJ).

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

3. Materials listing and certification indicating that products adhere to standard specifications.
4. Installation methodology.
5. Specifications/ Product Data: Manufacturer's data sheets on each product to be used, including:
 - i. Preparation instructions and recommendations.
 - ii. Storage and handling requirements and recommendations.
 - iii. Installation methods.
6. Shop drawings - fabrication and installation and attachment details indicating mounting heights, locations of supports and/or accessories.
7. Manufacturer's Installation Instructions: Printed installation instructions for each signage system.
8. Listing of the fonts, typestyles and graphics to be utilized.
9. Samples of the colours and materials to be utilized for approval.

3.16 QUALITY ASSURANCE

7. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
8. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
9. Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - i. Furnish signs designated by Architect.
 - ii. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - iii. Refinish mock-up area as required to produce acceptable work.

3.03 SAFETY, SECURITY, OPERATIONS

4. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

1. ANSI 117.1 - For Buildings and Facilities
2. ASTM D149, ASTM D150, ASTM D256, ASTM D542, ASTM D570, ASTM D635, ASTM D638, ASTM D648, ASTM D695, ASTM D696, ASTM D732, ASTM D785, ASTM D79, ASTM D792, ASTM D1003, ASTM D1929, ASTM D2843, ASTM D3418, ASTM D3763, ASTM E84, ASTM E2072-04, ASTM E2073-02.
3. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
4. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.
5. NFPA 70 – The National Electrical Code (NEC) Handbook

5.00 DURABILITY

4. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic
5. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

5. All signage shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.
6. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of 5 years commencing on Date of Substantial Completion.

SECTION 1307 – BIRD, INSECT & VERMIN CONTROL SYSTEMS

3.0 GENERAL

1.02 DESCRIPTION

10. This section includes the supply and installation of the following:

- a. Bird barriers to block access to pest birds from any open area, opening or complicated bird roost in order to prevent damage from droppings and nesting materials.
- b. Insect barriers to exclude insects from certain areas preventing the spread of microorganisms, disease and damage to food stocks from droppings and nesting materials.
- c. Rodent barriers to exclude insects from certain areas preventing the spread of microorganisms, disease and damage to food stocks from droppings and nesting materials.

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install the following:

- 7 Bird barriers
- 8 Insect barriers
- 9 Rodent barriers

1.03 PRODUCTS

This section may include a combination of the following products/ elements:

13. Bird Barriers

- a. Barriers constructed of polyethylene twine, available in a range of colours to blend with the background, with a range of mesh sizes to occlude various pest birds (from ¾" - 4" mesh). Available in a range of widths and lengths to suit a variety of applications.
- OR
- b. Barriers constructed of minimum 27 gauge galvanized steel mesh available in a range of mesh sizes to occlude various pest birds (from ¾" - 4" mesh). Available in a range of widths and lengths to suit a variety of applications.

14. Insect Barriers

- a. Barriers constructed of porous fabric with a mesh small enough to exclude certain insects without excluding light and airflow. Available in a range of widths and lengths to suit a variety of applications.

15. Rodent Barriers

- a. Rodent accessible openings: exposed pipes, wires, conduits etc. shall be covered with the following:
 - i. a wire cloth at least 0.035 inches (.089mm) wire OR
 - ii. solid sheet metal guards 0.024 inches (0.61 mm) thick or heavier
- b. Windows and other openings for the purpose of light and ventilation located in exterior walls within 2 feet (610mm) of the ground level shall be covered for their entire height with wire cloth 0.035 inches (.089mm)

2.00 APPLICATION

1. To provide systems necessary for bird, insect & vermin control within the facility as specified by the user requirements, the International Building Code (IBC) and/ or by the local Authority Having Jurisdiction (AHJ).

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

4. Materials listing and certification indicating that products adhere to standard specifications.
5. Installation methodology
6. Specification/ Cut Sheets

3.17 QUALITY ASSURANCE

4. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
5. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
6. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.18 SAFETY, SECURITY, OPERATIONS

2. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

4.01 INTERNATIONAL BUILDING CODE (IBC) REFERENCES

2. The design of elements in this section are to comply with the requirements the IBC generally paying particular attention to the following:
 - a. IBC 2015 Appendix F101 Rodent Proofing

5.00 DURABILITY

3. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic
4. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage

7. All bird, insect & vermin control systems shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.
8. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of 5 years commencing on Date of Substantial Completion for the bird, insect & vermin control systems detailed in this section.

SECTION 1310 – EXTERNAL SIGNAGE

4.0 GENERAL

1.01 DESCRIPTION

This section includes external building signage comprising of the following:

All fixtures, fittings, fastening and accessories and electrical components necessary for the fabrication and installation of the external building signage as specified by the user requirements, and in keeping with the requirements of the local Authority Having Jurisdiction (AHJ).

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install one or more of the following:

1. Signage consisting of cast metal dimensional characters.
2. Signage consisting of extruded metal dimensional characters.
3. Signage consisting of cut-out metal dimensional characters.
4. Signage consisting of moulded-plastic dimensional characters.

1.03 PRODUCTS

This section may include a combination of the following products/ elements:

1. Cast metal dimensional characters having one or more of the following characteristics:
 - a. Characters having uniform faces, precisely formed lines and profiles.
 - b. Aluminium Castings complying with : ASTM B26 – Standard Specification for Aluminium – Alloy Sand Castings
 - c. Copper Alloy (Brass) Castings complying with : ASTM B584 – Standard Specification for Aluminium – Alloy Sand Castings
2. Extruded metal dimensional characters having one or more of the following characteristics:
 - a. Characters having uniform faces, precisely formed lines and profiles.
 - b. Aluminium Extrusions complying with: ASTM B221 – Standard Specification for Aluminium and Aluminium Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
3. Cut-out metal dimensional characters having one or more of the following characteristics:
 - a. Characters having uniform faces, smooth, clean cuts and precisely formed lines and profiles.
 - b. Aluminium cut-out characters complying with ASTM B209 – Standard Specification for Aluminium and Aluminium Alloy Sheet and Plate
 - c. Copper Alloy (Brass) cut-out characters complying with ASTM B36 – Standard Specification for Brass Plate, Sheet, Strip and Rolled Bar
4. Moulded-plastic dimensional characters.
 - a. Characters having uniform faces, precisely formed lines and profiles.
 - b. Acrylic characters complying with ASTM D4802 – Standard Specification for Poly (Methyl Methacrylate) Acrylic Plastic Sheet
5. Electrical components devices and accessories tested by the Underwriters Laboratory (UL) and in compliance with NFPA 70 – The National Electrical Code (NEC) Handbook
6. Fasteners, anchors and adhesives
 - a. For external signage stainless-steel fasteners shall be used
 - b. Concealed fasteners and anchors shall be used unless otherwise indicated
 - c. Exposed metal fasteners shall be matched to final finish of the sign
 - d. Adhesives shall have a VOC content of less than 70 g/L
 - e. Asphalt-base emulsion protective coatings for Metal shall comply with ASTM D1187- Standard specification for Asphalt-Base Emulsion for Use as Protective Coatings for Metal

2.00 APPLICATION

1. External building signage as specified by the user requirements, and in keeping with the requirements of the local Authority Having Jurisdiction (AHJ).

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology.
3. Specification/ Cut Sheets.
4. Shop drawings - fabrication and installation and attachment details indicating mounting heights, locations of supports and/or accessories.
5. Listing of the fonts, typestyles and graphics to be utilized.
6. Samples of the colours and materials to be utilized.

3.19 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

1. ASTM B26
2. ASTM B584
3. ASTM B221
4. ASTM B209
5. ASTM B36
6. ASTM D4802
7. ASTM D1187
8. NFPA 70

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and

anchorage

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. All signage shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.
2. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of 5 years commencing on Date of Substantial Completion.

SECTION 1404 – UNFRAMED ISOLATED TRIMS/ SKIRTINGS/ SUNDRY ITEMS

1.0 GENERAL

1.01 DESCRIPTION

Trims shall refer to mouldings applied around doors and windows, or to conceal rough cuts, conceal joints, corners and changes in material

Skirtings shall refer to a continuous border material at the base of a wall to be both protective and decorative in nature.

Sundry Items shall refer to miscellaneous items or works that do not readily fit into standard categories.

1.02 SCOPE

Work to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install all trims and skirtings as indicated in the design drawings.

1.03 PRODUCTS

1. Mouldings:
 - a. Solid Concrete Mouldings
 - b. Structural Foam Mouldings
2. Skirtings:
 - a. Timber Skirtings
 - b. Tile Skirtings
 - c. Vinyl Skirtings
3. Adhesives.

2.00 APPLICATION

1. Mouldings: Exterior windows as indicated in the design, special façade elements as indicated in the design drawings.
2. Skirtings: In all interior spaces
3. Sundry Items: Not applicable

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval the following:

1. For door and window hardware:

- a) Cut sheets for all products to be used
 - b) Verification Samples: representative units of each type, size, surface finish of door or window hardware
 - c) Approved Door and Window Schedules with corresponding Hardware Schedules
 - d) Door and Window Hardware supplier information and contact information upon closeout.
 - e) Care and maintenance instructions for all hardware upon closeout.
2. For Grille work elements:
 - a) Shop Drawings: Include plans, elevations, sections, and attachment details
 - b) Samples of welded connections; Show method of finishing members at intersections. Samples need not be full height.

3.20 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All structural aspects of work covered in this specification shall be subject to inspection by the Engineer, or his representative. The Contractor shall submit a schedule of his activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.
3. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials

3.03 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement.

4.00 REFERENCED STANDARDS

Consult latest versions of the following standards:

1. ASTM A276 – Standard Specification for Stainless Steel Bars and Shapes
2. ASTM B633 – Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
3. ANSI /BHMA A156 Series

5.00 DURABILITY

6. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers
7. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. Supply Warranties for door and window hardware as per supplier. Warranty period shall be a minimum of 3 years against defects in material and workmanship from the date of substantial completion.
2. Grille-work elements shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration or stains caused by foreign substances, Acts of God (environmental disasters beyond normal climactic conditions) and

PERFORMANCE SPECIFICATIONS

modifications/ repairs done by anyone other than the contractor or his/her designated representative.

SECTION 1405 – DOOR & WINDOW IRONMONGERY

1.0 GENERAL

1.01 DESCRIPTION

Architectural ironmongery shall refer to items made from iron, steel, aluminium, brass or other metals. Such items, sometimes also described as architectural hardware, include door handles, locks, door closers, hinges, window fittings, metal door and window grille work / burglar proofing .

1.02 SCOPE

Work to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install all ironmongery items including anchorage systems.

1.03 PRODUCTS

1. **Door Hardware:** door hinges, escutcheons, latches, bolts, cylinders, pulls must be at minimum Commercial / security Grade 2, provided that Grade 2 is sufficiently granted warranty by the supplier for the specific application. Otherwise, door hardware will be Commercial Grade 1 with functions as defined by ANSI /BHMA A156. Confirm that functions are permitted by Local Codes and Regulations. Consult NFPA 80 (latest version) concerning hinge requirements for fire doors.
2. **Window Hardware:** locks, pulleys, sash handles, fasteners, catches, hinges must be at minimum Commercial / security Grade 2, provided that Grade 2 is sufficiently granted warranty by the supplier for the specific application. Otherwise, door hardware will be Commercial Grade 1 with functions as as defined by ANSI /BHMA A156
3. **Grille Work Elements:** Hollow section steel elements (Square hollow section: SHS, Rectangular Hollow Section: RHS, Circular Hollow Section: CHS). Bars and Shapes: ASTM A 276, Type 304.
 - a) For the fabrication of work exposed to view, use only materials that are smooth and free of surface blemishes, including pitting, seam marks, roller marks, rolled trade names, and roughness. Remove blemishes by grinding, or by welding and grinding, before cleaning, treating, and applying surface finishes.
 - b) Use materials of size and thicknesses indicated or, if not indicated, of the size and thickness necessary to produce adequate strength and durability in the finished product for its intended use. Work the materials to the dimensions indicated on approved detail drawings, using proven details of fabrication and support. Use the type of materials indicated or specified for the various components of work.
 - c) Form exposed work true to line and level, with accurate angles and surfaces and straight sharp edges. Ensure that all exposed edges are eased to a radius of approximately 0.8 millimetre 1/32 inch. Bend metal corners to the smallest radius possible without causing grain separation or otherwise impairing the work.

PERFORMANCE SPECIFICATIONS

- d) Form the exposed connections with hairline joints that are flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of the type indicated or, if not indicated, use countersunk Phillips flathead screws or bolts.
 - e) Provide anchorage of the type indicated and coordinated with the supporting structure. Fabricate anchoring devices and space as indicated and as required to provide adequate support for the intended use of the work.
 - f) Seismic Performance: Where seismic resilience is required, provide railings, connections, and/or components identified which will accommodate movement without permanent inelastic deformation.
4. **Paints and Coatings:** Coatings on ferrous and galvanized metal surfaces shall consist of a prime coat and not less than two finish coats. Coatings shall have high abrasion resistance, good flexibility and chemical resistance, UV resistance and be applied in a manner that yields a uniform coverage and thickness, without bubbles, bulges and other textural inconsistencies.
5. **Fasteners for Anchoring to Other Construction:** Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

Fastener materials – Unless otherwise indicated, provide the following:

- a) Stainless-Steel Components: Type 304 stainless-steel fasteners.
- b) Brackets, Flanges, and Anchors: Same metal and finish as supported members unless otherwise indicated.
- c) Uncoated Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed; Type 304 stainless steel fasteners where exposed.
- d) Galvanized-Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.
- e) Dissimilar Metals: Type 304 stainless-steel fasteners.

2.00 APPLICATION

- 1. Interior and exterior doors
- 2. Exterior Windows
- 3. Exterior Grille-work building entry

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval the following:

- 1. For door and window hardware:
 - f) Cut sheets for all products to be used

- g) Verification Samples: representative units of each type, size, surface finish of door or window hardware
 - h) Approved Door and Window Schedules with corresponding Hardware Schedules
 - i) Door and Window Hardware supplier information and contact information upon closeout.
 - j) Care and maintenance instructions for all hardware upon closeout.
2. For Grille work elements:
- c) Shop Drawings: Include plans, elevations, sections, and attachment details
 - d) Samples of welded connections; Show method of finishing members at intersections. Samples need not be full height.

3.21 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All structural aspects of work covered in this specification shall be subject to inspection by the Engineer, or his representative. The Contractor shall submit a schedule of his activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.
3. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials

3.03 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement.

4.00 REFERENCED STANDARDS

Consult latest versions of the following standards:

1. ASTM A276 Standard Specification for Stainless Steel Bars and Shapes
2. ASTM B633 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
3. ANSI /BHMA A156 Series

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

PERFORMANCE SPECIFICATIONS

1. Supply Warranties for door and window hardware as per supplier. Warranty period shall be a minimum of 3 years against defects in material and workmanship from the date of substantial completion.
2. Grille-work elements shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration or stains caused by foreign substances, Acts of God (environmental disasters beyond normal climactic conditions) and modifications/ repairs done by anyone other than the contractor or his/her designated representative.

SECTION 1506 –EXTERNAL WORKS – INTERLOCKING BRICKS/ BLOCKS, ROADS & PAVING

1.0 GENERAL

1.01 DESCRIPTION

1. External works incorporates the immediate surrounding context of a building.
2. Paving incorporates the variation of materials uses to create hard surface area “hardscape” for a buildings surroundings.

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install the following works:

1. Minor roads
2. Pathways
3. Driveways
4. Parking

1.03 PRODUCTS

External works / Paving may include a combination of the following products/ elements:

1. Paving to comply with:
 - a. ASTM D3666(16): Standard specification for minimum requirements for agencies testing and inspecting road and paving materials
2. Aggregate to comply with:
 - a. ASTM D448(12) – Standard classification for sizes of aggregate for road and bridge construction
 - b. ASTM D242M(19 – Standard specification for mineral filler for asphalt mixtures
 - c. ASTM D692M(20) – Standard specification for coarse aggregate for asphalt paving mixtures
 - d. ASTM D1073(16) – Standard specification for fine aggregate for asphalt paving mixtures
3. Asphalt to comply with:
 - a. ASTM D5710M – Standard specification for Trinidad lake modified asphalt
 - b. ASTM D977(20) – Standard specification emulsified asphalt
 - c. ASTM D4215(20) – Standard specification for cold mixed, cold laid asphalt paving mixtures
 - d. ASTM D946 – Standard specification for penetration – graded asphalt binder for use in pavement construction
 - e. ASTM D2026, D2027, D2028 – Standard specification for cutback asphalt
4. Filler materials to comply with:
 - a. ASTM D5078 – Standard specification for crack fillers, hot applied for asphalt concrete and Portland cement concrete pavements
5. Surface texture to comply with:
 - a. ASTM E501 – Standard specifications for standard rib tire for pavement skid-resistance test
 - b. ASTM E524(08)2020 – Standard specification for smooth tire for pavement skid-resistance test

2.00 APPLICATION

1. External site work
2. Minor road surfaces
3. Pavements

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology

3.22 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

4.00 REFERENCED STANDARDS

1. ASTM D3666(16)
2. ASTM D448(12)
3. ASTM D242M(19)
4. ASTM D692M(20)
5. ASTM D1073(16)
6. ASTM D5710M
7. ASTM D977(20)
8. ASTM D4215(20)
9. ASTM D946
10. ASTM D2026,2027,2028
11. ASTM D5078
12. ASTM E201
13. ASTM E524(08) 2020

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic, excluding joint sealers
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage
3. Joint sealers: Lifespan expectancy equal to that specified for primary weather barriers.

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. External works interlocking bricks/ blocks, roads & paving shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.

SECTION 1701 – PLUMBING

PART 1 GENERAL

1.01 SCOPE OF THE WORKS

All plumbing systems are to be installed in accordance with the RFP, End User requirements and the national plumbing code of Trinidad & Tobago.

2.01 SECTION INCLUDES

A. Plumbing elements comprise the following:

1. Water Supply: Water sources and storage.
 - a. Water source for fire suppression systems.
2. Domestic Water: All elements required to distribute water to fixtures, including piping and equipment for water cooling, heating and storage.
 - a. Water Distribution: Piping within the building, serving fixtures, specialties, and equipment.
 - b. Plumbing Equipment: Pumps, tanks, filters, controls and treatment equipment.
3. Sanitary Waste: All elements required for removal of sanitary waste, including piping, venting, discharge and disposal, and equipment.
4. Rain Water Drainage: All elements required for drainage of rain water from building areas in which it may accumulate and drainage of clear wastes from building services; not including gutters and downspouts or sub drainage.
5. Plumbing Fixtures: All fixtures necessary for sanitation, occupancy, and use that are connected to water supply or drainage; not including water heating or conditioning equipment or kitchen appliances.
6. Other Plumbing Elements: Services elements required for a complete plumbing system.

A. Utility Sources and Outlets:

1. Water Source: Existing public utility.
2. Sewage Disposal: Connect building sewer to the existing public sewage system.
3. Rain Water Drainage Outlet: Existing public utility storm drainage system independent of sanitary sewer.

2.02 RELATED REQUIREMENTS

- Section 101 – Preliminaries
- Section 400 – Earthworks
- Section 1101 – Windows, Rooflights, Screens & Louvers
- Section 1304 – Sanitary Appliances & Fittings
- Section 1506 – External Works – Interlocking Bricks/Blocks, Roads & Paving
- Section 2315 – Mechanical (HVAC)
- Section 2316 – Mechanical (Elevators)
- Section 2320 – Electrical
- Section 2321 – Electrical (Lighting)
- Section 2330 – ICT
- Section 2340 – Plumbing
- Section 2345 – Fire Suppression
- Section 2350 – Commissioning
- Section 2360 – Training
- Section 2370 – Handover Documentation
- RFP and End User Requirements (User Brief, Schedules, ICT, Security) Documentation

2.03 REFERENCE STANDARDS

- ASCE 7 - Minimum Design Loads for Buildings and Other Structures
- ASME B16 – Standards of Pipes and Fittings
- ASME B31 – Standards of Pressure Piping
- ASME B31.9 – 20120 Building Services Piping
- ICC IFC 2018-2021 International Fire Code
- ICC IPC 2018-2021 International Plumbing Code
- ICC IMC 2018-2021 International Mechanical Code
- NFPA 13 – 2019 Standard for the Installation of Sprinkler System
- NFPA 14 - 2019 Standard for the Installation of Standpipes and Hose Systems
- NFPA 20 – 2019 Standard for the Installation of Stationary Pumps for Fire Protection
- NFPA 22 – 2018 Standard for Water Tanks for Private Fire Protection
- NFPA 24 – 2019 -2022 Standard for the Installation of Private Fire Service Mains and Their Appurtenances
- NFPA 70 – 2020 National Electric Code
- NFPA 101 - 2021 Life Safety Code
- Requirements of the OSH Authority in accordance with the OSH Act 2004 with amendments of 2006
- Requirements of the EMA of Trinidad and Tobago & Water Pollution Rules 2019
- Requirements of the Trinidad and Tobago Fire Service (TTFS), Ministry of National Security of Trinidad and Tobago
- Requirements of the Public Health Department in accordance with the Public Health Ordinance Act

- The National Plumbing Code of Trinidad and Tobago
- Trinidad & Tobago Electricity Commission Wiring for Light & Power 8th Edition
- Trinidad & Tobago Electrical Wiring Code Part 1 - Low Voltage Installations (TTS 171: Part 1: 2015)
- Water and Sewerage Authority Guidelines for Design and Construction of Water and Wastewater Systems in Trinidad and Tobago

PART 2 PRODUCTS (NOT USED)

PART 3 DESIGN CRITERIA

3.01 PIPING, IN GENERAL

3.02 DOMESTIC WATER PIPING AND EQUIPMENT

- A. Water Piping, Buried:
 - 1. Use one of the following:
 - a. Polyvinyl chloride (PVC) SCH 40 plastic pipe and fittings, with solvent welded joints.
- B. Water Piping, Not Buried:
 - 1. Use one of the following:
 - a. Polyvinyl chloride (PVC) SCH 40 plastic pipe and fittings, with solvent welded joints.
- C. Valves For Shut-Off or Isolation of Equipment, Fixtures, and Parts of Systems:
 - 1. Use one of the following:
 - a. Ball valves.
 - b. Gate valves.
 - c. Butterfly valves.
- D. Method of Removing Air from Supply Piping:
 - 1. Use one of the following:
 - a. Automatic air vents.
 - b. Manual air vents.

3.03 SANITARY WASTE AND VENT PIPING AND EQUIPMENT

- A. Sanitary Waste and Vent Piping, Buried:
 - 1. Use one or more of the following:
 - a. Polyvinyl chloride (PVC) DWV pipe and fittings, with solvent welded or gasketed joints.
- B. Sanitary Waste and Vent Piping, Not Buried:
 - 1. Use one or more of the following:
 - a. Polyvinyl chloride (PVC) DWV pipe and fittings, with solvent welded joints.

3.04 RAIN WATER PIPING AND DRAINS

- A. Rain Water Piping, Not Buried:
 - 1. Use one or more of the following:
 - a. Polyvinyl chloride (PVC) DWV pipe and fittings, with solvent welded joints.
- B. Rain Water Piping, Buried:
 - 1. Use one or more of the following:
 - a. Polyvinyl chloride (PVC) pipe and fittings, with solvent welded or gasketed joints.
- C. Roof Drains, Area Drains, and Floor Drains:
 - 1. Use one or more of the following:
 - a. Bronze.
 - b. Galvanized cast iron.

3.05 PLUMBING FIXTURES

- A. Water Closets:
 - 1. Use one or more of the following:
 - a. External flush valve type.
 - a. Vitreous china.
 - b. Wall mounted fixtures.
- B. Urinals:
 - 1. Use one or more of the following:

PERFORMANCE SPECIFICATIONS

- a. Vitreous china.
 - a. Wall mounted fixtures.
- C. Lavatories:
 - 1. Use one or more of the following:
 - a. Vitreous china.
 - b. Countertop-mounted fixtures.
 - b. Under counter-mounted fixtures.
- D. Kitchen Sinks:
 - 1. Use one or more of the following:
 - a. Stainless steel.
 - b. Countertop-mounted fixtures.
 - c. Pedestal-mounted fixtures.
- E. Faucets and Trim:
 - 1. Use one or more of the following:
 - a. Polished chrome-plated finish.
- F. Drinking Fountains:
 - 1. Use one or more of the following:
 - a. Electric water coolers.
- G. Utility (Mop or Janitor's) Sinks:
 - 1. Use one or more of the following:
 - a. Stainless steel.
 - b. Wall-hung fixtures.

3.06 BASIC FUNCTION

- A. Provide water supply necessary for building occupancy and use.
- B. Provide delivery of domestic water to points of utilization.
- C. Provide water supply for fire sprinkler system and standpipes.

PERFORMANCE SPECIFICATIONS

- D. Provide drainage for disposal of waste as required by the code and for the following:
 - 1. Fixtures and equipment which have a waste connection or a domestic water connection.
 - a. Waste connections are not required on icemakers, refrigerators with icemakers, exterior hose bibs, and coffee makers.
 - 2. Indirect Drainage: Floor drains to receive piping from:
 - a. Equipment drain pans.
 - b. Condensate drains.
 - c. Other equipment that produces clear wastes.
 - d. Other equipment specified to have indirect drain.
- E. Provide drainage for disposal of rain water and clear wastes, as required by the code.
- F. Provide plumbing fixtures necessary for occupancy, use, and sanitation.
- G. Equipment that is Not Part of Services Systems: Specified in the project program and in Sections DC E1 through DC E19.
- H. In addition to the requirements of this section, comply with all applicable requirements of Section DC 0 - Facility Design Criteria.

3.07 AMENITY AND COMFORT CRITERIA

- A. Noise:
 - 1. Design to prevent noise due to air trapped in piping systems.
 - 2. Provide water hammer arrestors as shown on drawings to eliminate noise produced by the domestic water fixtures.
 - 3. Minimize noise produced by fixtures.
- B. Convenience:
 - 1. Fixture Heights: As specified in code.
 - 2. Fixture Configurations: As specified in code.
 - 3. Maneuvering Space: Provide comfortable space between and around fixtures.
 - 4. Faucets: Single action operation in the following locations.
 - a. Restrooms
 - b. Executive restrooms
 - 5. Install floor drains flush with the surface on which they are installed, out of pedestrian traffic patterns wherever possible.

PERFORMANCE SPECIFICATIONS

6. Do not locate floor drains and floor cleanouts in doorways or directly in traffic paths.

C. Odors:

1. Locate odor producing elements in areas separate from human occupancy in dedicated equipment rooms.
2. Do not locate sanitary waste vent openings where odors are noticeable by occupants or by occupants of adjacent properties or where odor-bearing air may enter building spaces. a. Do not terminate vents within 3 m horizontally of doors, windows, air intake or exhaust openings, or other openings in the exterior enclosure, unless vent termination is at least 1 m above the top of the opening.
3. Provide traps for all indoor drains connected to rain water drainage system.

D. Appearance:

2. Do not locate rain water leaders or downspouts where they are visible from the outside of the building.
 2. Vents: Conceal vents from view.
1. Fixtures:
 - a. Smooth, corrosion-resistant, non-absorbent, with no crevices to collect dirt.
 - b. Aesthetically pleasing and easy and comfortable to use; high style appearance is very important.
 - c. Color: White, except where metal fixtures are required.

3.08 HEALTH AND SAFETY CRITERIA

A. Health: Provide potable water.

1. Public utility water can be considered to be potable.
2. Maintain the safety of the potable water source at all times.
3. Do not connect the potable water source to any non-potable water source.
4. Keep animals and vermin out of open pipes, tanks, and other system components.
5. Keep other contaminants out of the distribution systems, equipment, and water source.
6. All openings and edges around the sides and bottom of each fixture permanently sealed with waterproof material.
7. Do not locate indirect drains in toilet rooms, unventilated or inaccessible rooms, or in air distribution or return plenums.
8. Provide a backflow prevention device in the sewer discharge to prevent back-up into plumbing fixtures and floor drains.

PERFORMANCE SPECIFICATIONS

- B. Waste Disposal: Connect each fixture to sanitary drainage system for proper disposal of waste and harmful materials.
- C. Pressure Control: Control pressures to protect the building, fixtures, equipment, and occupants from harm.

- 1. Maximum Water Distribution Working Pressure: 550 kPa.

- D. Burn Hazards:

3.09 DURABILITY CRITERIA

- A. Expected Service Life Span: Same as service life of building unless otherwise indicated.

- 1. Plumbing Fixtures: Same as building service life.

3.10 OPERATION AND MAINTENANCE CRITERIA

- A. Fixture Functions:

- 1. Lavatories: Standard spout, with integral overflow.
 - 2. Urinals: Siphon jet flushing action.
 - 3. Kitchen Sinks: Swivel spout, water spray nozzle.

- B. Water Consumption:

- 1. Water Closets: 6 liters per flush, maximum, with complete waste removal in one flush.
 - 2. Urinals: 3.8 liters per flush, maximum, with complete waste removal in one flush.
 - 3. Lavatory Faucets in Public Restrooms: 0.95 liters per use.
 - 4. Shower Heads: 9.5 liters per minute, maximum.

- C. Capacity of Water Service: Provide adequate water flow and pressure to supply peak demand requirements. Comply with requirements specified in the code and the following.

- 1. Validation:

- a. Preliminary Design: Analysis and documentation of water supply source and flow conditions.
 - b. Construction: Prior to installation of plumbing fixtures and prior to concealment of piping, air and water tests of piping systems at 110 percent of operating pressure, maintaining pressure for 2 hours to demonstrate system is watertight.
 - c. Construction: Functional tests of fixtures and equipment.

- D. Waste Pipe Sizing:

1. Size piping as required by code.
2. Building Drain: 100 mm diameter, minimum.

3.11 WARRANTIES AND GUARANTEES

1. All Plumbing components and systems inclusive of equipment and its associated accessories shall have a minimum warranty for a period of (2) years against faulty workmanship including: installation defects and manufacturer's defects inclusive of the required maintenance to maintain such warranties. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the Design Build Contractor or his/her designated representative.
2. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of (2) two years commencing on Date of Substantial Completion with the option for extended warranties past the (3) two years.

SECTION 1705 – FIRE SUPPRESSION

PART 1 GENERAL

1.01 SCOPE OF THE WORKS

The supply and installation of the fire suppression systems made up of 1) Sprinkler System and 2) Fire Hose Reel System 3) Gas Suppression System for ICT equipment rooms in accordance with the relevant codes.

2.01 SECTION INCLUDES

- A. Fire suppression comprises the following elements:
- B. Fire Sprinkler and Extinguishing Systems: Elements which automatically extinguish fires; automatic fire suppression is required only for the following areas:
 - 1. Lobby.
 - 2. General offices.
 - 3. Computer room.
 - 4. Kitchen.
 - 5. Other areas per NFPA and Trinidad & Tobago Fire Service requirements.
- C. Standpipe and Hose Systems: Elements that deliver adequate supplies of water to locations in the building for manual fire-fighting.
- D. Other Fire Protection Elements: Elements that are not covered in other fire protection Sections.
- E. Products: Where specific products are required or allowed, use products complying with the additional requirements specified elsewhere.

2.02 RELATED REQUIREMENTS

- Section 101 – Preliminaries
- Section 1304 – Sanitary Appliances & Fittings
- Section 2310 – Design Procedures and Validation Requirements
- Section 2315 – Mechanical (HVAC)
- Section 2316 – Mechanical (Elevators)
- Section 2320 – Electrical
- Section 2321 – Electrical (Lighting)
- Section 2330 – ICT
- Section 2340 – Plumbing
- Section 2350 – Commissioning
- Section 2360 – Training
- Section 2370 – Handover Documentation
- RFP and End User Requirements (User Brief, Schedules, ICT, Security) Documentation

2.03 REFERENCE STANDARDS

- ASCE 7 - Minimum Design Loads for Buildings and Other Structures
- ASME B16 – Standards of Pipes and Fittings
- ASME B31 – Standards of Pressure Piping
- ASME B31.9 – 20120 Building Services Piping
- ICC IFC 2018-2021 International Fire Code
- ICC IPC 2018-2021 International Plumbing Code
- ICC IMC 2018-2021 International Mechanical Code
- NFPA 10 – 2018 Standards on Portable Fire Extinguishers
- NFPA 13 – 2019 Standard for the Installation of Sprinkler System
- NFPA 14 - 2019 Standard for the Installation of Standpipes and Hose Systems
- NFPA 15 – 2022 Standard water spray fixed systems for fire protection
- NFPA 17 – 2021 Standard for Dry Chemical Extinguishing Systems
- NFPA 17A – 2021 Standard for Wet Chemical Extinguishing Systems
- NFPA 20 – 2019 Standard for the Installation of Stationary Pumps for Fire Protection
- NFPA 22 – 2018 Standard for Water Tanks for Private Fire Protection
- NFPA 24 – 2019 -2022 Standard for the Installation of Private Fire Service Mains and Their Appurtenances
- NFPA 70 – 2020 National Electric Code
- NFPA 72 – 2019 National Fire Alarm and Signalling Code
- NFPA 90A – 2021 Standard for the Installation of Air-Conditioning and Ventilating Systems
- NFPA 92 – 2021 Standard for Smoke Control Systems
- NFPA 101 - 2021 Life Safety Code
- Requirements of the OSH Authority in accordance with the OSH Act 2004 with amendments of 2006
- Requirements of the Trinidad and Tobago Fire Service (TTFS), Ministry of National Security of Trinidad and Tobago
- Requirements of the Public Health Department in accordance with the Public Health Ordinance Act
- The National Plumbing Code of Trinidad and Tobago
- Trinidad & Tobago Electricity Commission Wiring for Light & Power 8th Edition
- Trinidad & Tobago Electrical Wiring Code Part 1 - Low Voltage Installations (TTS 171: Part 1: 2015)
- Water and Sewerage Authority Guidelines for Design and Construction of Water and Wastewater Systems in Trinidad and Tobago

PART 2 PRODUCTS NOT USED

PART 3 DESIGN CRITERIA

3.01 FIRE SUPPRESSION SYSTEM TYPES

A. Do not use:

1. CFC, HCFC, or Halon-based extinguishing agents.

B. Use one or more of the following:

1. Wet pipe sprinkler system.
2. Dry pipe sprinkler system.
3. Standpipe system.

3.02 FIRE SPRINKLER AND EXTINGUISHING SYSTEM COMPONENTS

A. Pipe:

1. Use one or more of the following:

- a. Materials permitted by code.
- b. SCH 40 Carbon black steel

B. Fittings:

1. Use one or more of the following:

- a. Materials permitted by code.
- b. SCH 40 Carbon black steel fittings

C. Fire Pumps:

1. Use one or more of the following:

- c. Main Duplex pump set with associated control panel and accessories
- d. Jockey Pump as permitted by code.

3.03 STANDPIPE AND HOSE SYSTEM COMPONENTS

A. Pipe:

1. Use one or more of the following:

- a. Materials permitted by code.

- b. SCH 40 Carbon black steel
- B. Fittings:
 - 1. Use one or more of the following:
 - e. Materials permitted by code.
 - f. SCH 40 Carbon black steel fittings

3.04 BASIC FUNCTION

- A. Provide code-required fire suppression regardless of type or coverage specified.
- B. Fire Sprinklers: Types as indicated for specific spaces and areas.
 - 1. Design and construction in accordance with code and NFPA 13.
 - 2. Provide wet pipe sprinkler systems unless otherwise indicated or required by code.
 - 3. General Use (Not Indicated as another Type): Wet pipe.
 - 4. Lobby:
 - a. System Type: Wet pipe.
 - b. Occupancy: Light Hazard.
 - c. Density/Area: 3.3 L per min per sq m over 185 sq m.
 - 5. General Offices:
 - a. System Type: Wet pipe.
 - b. Occupancy: Light Hazard.
 - c. Density/Area: 3.3 L per min per sq m over 185 sq m.
 - 6. Computer Room:
 - a. System Type: Dry pipe.
 - b. Occupancy: Light Hazard.
 - c. Density/Area: 3.3 L per min per sq m over 185 sq m.
- C. Fire Extinguishing Systems: Types as indicated for specific spaces and areas.
 - 1. Dry-Chemical Extinguishing Systems: Design and construction in accordance with code and NFPA 17.
 - 2. Foam Extinguishing Systems: Design and construction in accordance with code and NFPA 11.

PERFORMANCE SPECIFICATIONS

- D. Where fire protection elements also must function as elements defined within another element group, meet the requirements of both element groups.
- E. In addition to the requirements of this section, comply with all applicable requirements of Section DC 0 - Facility Design Criteria.
- F. Validation:
 - 1. Proposal: Description of systems required, sources, input-side capacities, and means of distribution.
 - 2. Preliminary Design: Fire protection areas identified.
 - 3. Design Development: Fire protection zones indicated on the drawings with riser locations identified.
 - 4. Construction Documents: Complete system details.
 - 5. Construction and Closeout: Functional performance testing.

3.05 AMENITY AND COMFORT CRITERIA

- A. Leakage: Provide systems that are leak-free.
- B. Accessibility: Provide clearances around system components for service and use.
 - 1. Provide a hose cabinet at the end of each corridor.
- C. Convenience: Provide fire department connections for each standpipe as required by code.
- D. Appearance:
 - 1. All spaces unless indicated otherwise on the drawings: Concealed sprinklers.

3.06 HEALTH AND SAFETY CRITERIA

- A. Path of Egress: Provide systems which safeguard path of egress.
- B. Fire Source: Provide system materials which do not contribute to the spread of the fire.
- C. Fire Spread: Provide systems to limit spread of fire from storage area to office area.
- D. Chemical Exposure or Use: Provide systems which limit exposure of occupants to extinguishing agents.
- E. Dry-Chemical Nozzle Performance: As required by code and NFPA 17.
- F. Sprinkler Head Performance: As required by code and NFPA 13.
 - 1. Flammable Storage Room: ESFR sprinklers.

3.07 STRUCTURAL CRITERIA

A. Seismic Design:

1. Provide a sprinkler system which allows movement where differential movement is anticipated.
2. Provide sprinkler system supports capable of supporting twice its installed wet weight.

3.08 DURABILITY CRITERIA

A. Expected Service Life Span:

1. Provide a sprinkler system which will last a minimum of 10 years in service without major repairs or operating expense when maintained as specified in NFPA 25.
2. Sprinkler Heads, Valves, and Other Inlet and Outlet Components: Same as building service life.

3.09 OPERATION AND MAINTENANCE CRITERIA

A. Capacity: As required by code.

B. Ease of Use: Provide easy access to and working clearances around system components.

C. Ease of Use: Provide standpipes which comply with the acceptance requirements of NFPA 14.

D. Ease of Service:

E. Unauthorized Use: Provide systems which minimize activation and use by unauthorized persons.

F. Maintenance:

1. Provide sprinkler system and fire pump maintenance in accordance with NFPA 25.
2. Provide standpipe maintenance in accordance with NFPA 25.
3. Provide dry-chemical system maintenance in accordance with NFPA 17.

3.10 WARRANTIES AND GUARANTEES

1. All Fire Suppression components and systems inclusive of equipment and its associated accessories shall have a minimum warranty for a period of (3) years against faulty workmanship including: installation defects and manufacturer's defects inclusive of the required maintenance to maintain such warranties. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the Design Build Contractor or his/her designated representative.
2. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of (3) three years commencing on Date of Substantial Completion with the option for extended warranties past the (3) three years.

SECTION 1802 – HVAC

PART 1 GENERAL

1.01 SCOPE OF THE WORKS

1.02 SECTION INCLUDES

- A. HVAC: Artificial means of maintaining interior space comfort and air quality, including heating, cooling, ventilation, and energy supply.
- B. The HVAC system consists of the following elements used to maintain occupant comfort:
 - 1. Air Distribution: Elements required to supply, return, and exhaust air associated with cooling the building.
 - 3. Hydronic Distribution: Elements required to distribute water and other liquids for cooling.
 - a. System(s) required include low temperature water system, medium pressure water system, high temperature water system, chilled water system, and low temperature water system and chilled water system.
 - b. Configuration - All Systems: Reverse return.
 - c. Configuration - Heating Water: Reverse return.
 - d. Configuration - Chilled Water: Reverse return.
 - 4. DX R410a minimum Refrigerant Distribution: Elements required to distribute refrigerant for heating or cooling.
 - 5. HVAC Controls: Elements required to monitor and control HVAC equipment and systems.
 - 6. Smoke Control Systems: Elements required to control smoke in the event of a fire and to remove smoke after the fire is extinguished.
 - 7. Dedicated Secondary Cooling Units
 - 8. External Louvres, Supply and Return Grilles/Diffusers, Volume Control Dampers, Fire Dampers, MERV 10 minimum filters.

1.03 RELATED REQUIREMENTS

- A. Section 2310 – Design Procedures and Validation Requirements.
- B. Section 2320 - Electrical
- C. Section 2310 – Design Procedures and Validation Requirements
- D. Section 2350 - Commissioning Requirements: Functional performance testing; additional training requirements.

1.04 REFERENCED STANDARDS

- A. AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment;
- B. AHRI 310/380 - Packaged Terminal Air-Conditioners and Heat Pumps;
- C. ASHRAE Handbook—HVAC Applications, 2019
- D. ASHRAE Handbook—HVAC Systems and Equipment, 2020
- E. ASHRAE 55 – 2017 Thermal Environmental Conditions for Human Occupancy
- F. ASHRAE 62.1 - 2019 Ventilation for Acceptable Indoor Air Quality
- G. ASHRAE 90.1 - 2019 Energy Standard for Buildings except Low-Rise Residential Buildings
- H. ASHRAE Standard 202-2018 Commissioning Process for Buildings and Systems
- I. SMACNA (DCS) - HVAC Duct Construction Standards; 2005.

PRODUCTS

2.01 HVAC SYSTEM TYPES

- A. Air Cooled Chiller and Chiller Water System
- B. DX R410a Refrigerant System

2.02 AIR DISTRIBUTION

- A. Variable Air Volume Terminal Units
 - 1. Factory assembled externally powered, variable air volume control terminal. Unit shall be complete with damper assembly, flow sensor, externally mounted volume controller, collars for duct connection and all features.
 - 2. Damper Assembly
- B. Ductwork:

PERFORMANCE SPECIFICATIONS

1. Use one or more of the following:
 - a. Galvanized sheet metal duct
 - b. Flexible duct.
- C. Diffusers, Registers, and Grilles:
 1. Use one or more of the following:
 - a. Aluminum diffusers.
- D. Fans:
 1. Use one or more of the following:
 - a. Steel fan housing with an aluminum propeller.
- E. Air Filters:
 1. Use one or more of the following:
 - a. Panel filters.

2.03 HVAC CONTROLS

- A. Communications Protocols:
 1. Use one of the following:
 - a. BACnet
 - b. TCP/IP
- B. Control System Types:
 1. Use one or more of the following:
 - a. Direct digital control (DDC) system.
- C. Operators and Sensors:
 1. Use one or more of the following:
 - a. Pneumatic valve actuators.
 - b. Electric valve actuators.
 - c. Pneumatic sensors
 - d. Electrical sensors

PART 3 DESIGN CRITERIA

3.01 BASIC FUNCTION

- A. Provide natural and artificial means of controlling temperature, relative humidity, velocity and direction of air motion in the interior spaces enclosed by the shell, and reduction of airborne odors, particulates, and contaminant gases.
 - 1. Design HVAC to provide partially redundant systems.
- B. Distribute air to maintain the required space conditions.
 - 1. Maximum Air Velocity:
 - a. For 2500 Pa Duct Pressure Class: 10 m/s.
- C. Smoke Control: Provide a system to evacuate smoke after fire has been extinguished.
- D. Provide the elements necessary to control the building's indoor environment.
 - 1. Provide a building control system which controls the indoor environment, manages energy consumption, schedules preventative maintenance, controls interior lighting, controls exterior lighting, integrates fire alarm and security functions, monitors fuel consumption, monitors water usage, and monitors packaged equipment controls.
 - a. Provide a thermostat for each zone to maintain the required space conditions.
 - 2. Zoning and Space Temperature Control:
 - a. Dedicated terminal unit and thermostat for each corner space.
 - b. Single thermostat and terminal unit for spaces with similar function, exposure, and location.
 - 1) Zone interior spaces together, separate from exterior spaces.
 - a. Maximum Interior Zone Size - Cooling Mode: a minimum of 19 square meters.
 - b. Maximum Interior Zone Size - Heating Mode: a minimum of 19 square meters.
 - c. Zone each conference room, separately. Dedicate at least one terminal unit and thermostat to each zone.
 - d. Provide each computer room with a dedicated zone. Provide humidity and temperature control.
- E. Provide monitoring of major pieces of HVAC equipment.
- F. Monitor the following equipment:
 - 1. Air terminals.
- G. Control the following equipment:
 - 1. Air terminals.

2. Fan coil units.
- H. Where HVAC elements also must function as elements defined within another element group, meet the requirements of both element groups.
- I. Validation:
1. Design Development: Design calculations; documents showing zoning, air handlers, air terminals, equipment locations, equipment sizes, and air distribution; sample manufacturer data showing capacity available.
 2. Construction Documents: Complete system details.
 3. Construction: Manufacturer's data showing performance, certified by independent testing agency.
 4. Construction: Testing, adjusting, and balancing report indicating initial airflow, final airflow, initial temperature, and final temperature of each conditioned space. Measurement of parameters during dry season when the outside air temperature is within 10 percent of the dry season design conditions and during the winter when the outside air temperature is within 10 percent of the wet season design conditions.
 5. Construction and Closeout: Functional performance testing.

3.02 AMENITY AND COMFORT CRITERIA

- A. Thermal Performance: Design and construct to provide comfortable interior environment in accordance with the code and the following:
1. Interior Design Conditions:
 - a. Daytime Set point: 22 degree C, plus or minus 2 degree C except as specified otherwise.
 - b. Night Setback: 25 degree C.
 - c. Interior Relative Humidity range: 50 to 60 percent.
 - d. Interior Ventilation: Office space 5 CFM/person + 0.06 CFM/sq ft
 - e. Public Restroom Exhaust minimum: 70 CFM/Fixture (water closet /urinal), Private Toilet Exhaust minimum 70 CFM per Guest Room /Fixture (water closet /urinal).
 - f. Air Filtration: At minimum MERV 10 filters for HVAC equipment
 2. Outside Air Design Conditions:
 - a. Outside Air Design Temperature: 35 degree C dry-bulb; 30 degree C wet-bulb.

PERFORMANCE SPECIFICATIONS

- b. Dehumidification: 30 degree C dry-bulb; 26 degree C wet-bulb.
 - c. Exterior Relative Humidity range: 75 to 85 percent.
 - B. Odors: Eliminate, isolate, or exhaust odors produced by occupant functions and building services.
 - C. Sound Transmission and Vibration Resistance:
 1. Services:
 - a. Maintain the sound transmission characteristics of assemblies through which services must pass.
 - b. Prohibited Plumbing Noises: All sounds of flushing and of liquid running through pipes ("bathroom sounds") are prohibited outside of the rooms housing toilets, bathtubs, and showers, with the exception of when doors to those rooms are open.
 - c. Equipment Noises: Noise level below that which will be objectionable, based on occupancy of spaces.
 - d. When services are located within assemblies that perform sound isolation functions, consider the noise produced by the service itself as one of the external sound sources.
 2. Structure-Borne Sound and Vibration: Prevent transmission of perceptible sound and vibration from equipment that rotates, vibrates, or generates sound, by isolating such equipment from superstructure or by isolating equipment support foundations from building foundations.
 - a. Validation:
 - 1) Construction Documents: Details of isolation methods.
 - 2) Closeout: Measurement of sound transmitted through structure during functional performance testing and during full operation of all systems.
 - D. Convenience: Maintain existing entrances open during construction period; protect from weather, keep clear of construction debris and stored materials, and maintain safe walking surfaces.
 - E. Cleanliness:
 1. Exterior Surfaces: Design and select materials to:
 - a. Prevent attraction and adherence of dust and air-borne dirt and soot, and minimize appearance of settled dust and dirt.
 - b. Be washed reasonably clean by normal precipitation.
 - c. Prevent precipitation from washing settled dust and dirt over surfaces exposed to view.
 2. Services: Prevent accumulation of debris and dirt at floor mounted equipment, such as air handlers, chillers, pumps, switchgear, and panelboards by one or more of the following methods.
 - a. Provide 100 mm thick, concrete housekeeping pads.

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requirements.

- J. Indoor Air Quality: Provide sufficient ventilation to obtain acceptable indoor quality, determined using the Ventilation Rate Procedure of ASHRAE 62.1.
- K. Appearance:
 - 1. Diffuser Shape: Provide diffusers as per architect/interior designer requirements.

3.03 HEALTH AND SAFETY CRITERIA

- A. Life Safety: Provide interconnection and coordination of HVAC controls with other life safety systems.
- B. Fire Sources:
 - 1. Provide products which are rated for the specific locations where they are installed.
 - 2. Provide distribution elements constructed from incombustible materials.
- C. Fire Spread: Provide interlocks to prevent operation or start-up of air distribution elements when fire or smoke detection systems are in alarm condition.

3.04 DURABILITY CRITERIA

- A. Expected Service Life Span:
 - 1. HVAC:
 - a. Shut-Off Valves: Minimum (10) ten years.
 - b. Dampers, Louvers, Registers, Grilles: Same as service life of building.
 - c. Ducts, Piping, and Wiring in All Services: Same as the service life of the building.
 - d. Software and Firmware Integral to Operation of Services Equipment: Minimum (5) five years functional life without reprogramming required.
- B. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 38 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage.
- C. Validation: Since actual service life cannot be proven, validation of actual service life is not required; however, the following are reasonable indicators of anticipatable service life:
 - a. Preliminary Design or Design Development: Service life expectancy analysis, for each element for which life span is specified; including:

- 1) Length of effective service life, and aesthetic service life if specified, with action required at end; e.g. complete replacement, partial replacement, and refurbishment.
 - 2) Conditions under which estimate will be valid; e.g. expected uses, inspection frequency, maintenance frequency, etc.
- b. Design Development: Replacement cost, in today's dollars, for each major element that has a service life expectancy less than that of the project; include both material and labor cost, but not overhead or profit; base costs on installing in existing building, not as a new installation.
- c. Design Development: Life cycle cost of project, over the specified project service life, excluding operating staff costs; include costs of:
- 1) Replacement of each element not expected to last the life of the project; identify the frequency of replacement.
 - 2) Deduct salvage value of replaced elements.
 - 3) Calculate costs in today's dollars, disregarding the time value of money, inflation, taxes, and insurance.
- D. Water Penetration Resistance:
1. Shell: Design and select materials to prevent water penetration into the interior of shell assemblies, under conditions of rain driven by 56 km/h wind.
 - a. Exception: Controlled water penetration is allowed if materials will not be damaged by presence of water or freezing and thawing, if continuous drainage paths to the exterior are provided, and water passage to the building interior is prevented.
 - b. Validation: In addition to requirements specified for proven-in-use and proven by mock-up construction, drawings showing paths of water movement, with particular attention to changes in direction or orientation and joints between different assemblies.
 2. Component Mountings: Where components are mounted to surfaces that are required to be moisture-resistant, seal mounting surface of components to finish surface so that moisture cannot penetrate under or behind component, using material that is not affected by presence of water, that is mildew-growth resistant, and that has a minimum service life of 10 years.
- E. Corrosion Resistance: Prevent corrosion by using corrosion-resistant materials, by preventing galvanic action, by preventing contact between metals and concrete and masonry, and by preventing condensation on metals.
1. Separation of Dissimilar Metals:
 - a. Where different metals subject to galvanic action are exposed to weather or moisture, prevent direct contact between them.
 - b. Piping Connections for Piping of Dissimilar Metals: Dielectric adapters.
 2. Aluminum: Prevent direct contact of aluminum with concrete or cementitious materials.

PERFORMANCE SPECIFICATIONS

3. Steel: Where permitted to be coated with other than zinc, zinc-alloy, or aluminum-zinc alloy, follow the recommendations of Society for Protective Coatings (SSPC) in regard to preparation for coating and coating type.
 4. Outdoor Metal Elements Except in Contact with Soil: The following are considered corrosion-resistant metals:
 - a. Aluminum.
 - b. Stainless steel, Type 304 or 316.
 - c. Hot-dipped galvanized steel, with minimum zinc coating of 275 gm/sq m total, both sides, or equivalent aluminum-zinc alloy coating.
 - d. Cadmium-plated steel, with minimum coating of 12 micrometers.
 5. Indoor Metal Elements Potentially Exposed to Moisture: The following are considered corrosion-resistant metals:
 - a. All metals listed above for exterior exposure.
 - b. Brass and bronze, but not copper.
 - c. Cast iron, ductile iron, and malleable iron.
 - d. Steel coated with high-build epoxy or coal tar-based paint, with minimum coating of ?
 - e. Chrome-plated steel.
- F. Weather Resistance: Design and select materials to minimize deterioration due to precipitation, sunlight, ozone, normal temperature changes, salt air, and atmospheric pollutants.
1. Weather resistance requirements apply to all components exposed to the outdoor environment, including services, unless specifically accepted; equipment enclosures are considered the equivalent of the exterior enclosure.
 1. Deterioration includes corrosion, shrinking, cracking, spalling, delamination, abnormal oxidation, decay and rot.
 2. Surfaces Exposed to View: Deterioration adversely affecting aesthetic life span includes color fading, crazing, and delamination of applied coatings.
 3. Joint Components and Penetration Seals: Capable of resisting expected thermal expansion and contraction; use overlapping joints that shed water wherever possible.
 4. Transparent Elements (Glazing): No haze, loss of light transmission, or color change, during entire expected service life.
 - a. Test Criteria: Less than one percent change in haze, transmission, and color over two years exposure, when tested after natural exposure conditions or accelerated light and water conditions simulating natural exposure at project, in accordance with ASTM D1003; accelerated exposure documented with comparison to natural conditions.

5. Service Temperature: Low temperature equal to historically-recorded low; high temperature equal to that expected due to any combination of air temperature and heat gain from solar and other sources.
 6. Ozone Resistance: Do not use materials that are adversely affected by ozone.
 7. Liquid Storage and Distribution Components: Prevent freezing during longest duration of low temperature anticipated, based on historical weather data; if necessary, provide automatically controlled supplemental heating.
- G. Temperature and Humidity Endurance: Design equipment to endure temperature and humidity that will be encountered and to resist damage due to thermal expansion and contraction.
- H. Impact Resistance: Design and select materials to resist damage due to impact in accordance with code and the following:
1. Minimize damage from windborne debris propelled at up to 56 km/h.
 2. Design and select materials to resist damage from hail of size up to 12 mm.
 3. Minimize damage due to potential vandalism.
 4. Natural Hazards: Design to resist damage from perching, nesting, and feeding birds.
 5. Validation:
 - a. Design Development: Identification of building elements required to resist impact damage, quantification of impact criteria, materials to be used, and methods of validation.
 - b. Design Development: Proven in-use or proven by mock-up data.
- I. Accidental Damage Resistance:
1. Minimize potential for damage to built elements due to accidents.
 2. Accidental Water Leakage: Locate components that would be damaged by water leakage from pipes or through foundations or roof out of likely paths of water and at least 100 mm above floor level.
 3. Buried Components: Minimum of 300 mm below surface of ground.
 4. Underground Piping and Conduit: Watertight and root proof.
 5. Finishes on Exposed Components Subject to Touching by Occupants: Durable enough to withstand regular scrubbing using ordinary methods.
 6. Equipment: Provide equipment which has been designed to prevent tampering.
 7. Underground Piping: Protect Electrical ducting, HVAC and Plumbing piping from accidental damage with a warning tape buried 300 mm above the pipe.
- J. Wear Resistance: Design and select materials to provide resistance to normal wear-and-tear in accordance with code and the following:

1. Elements Within Reach of Pedestrians: Minimize degradation from rubbing and scratching caused by pedestrians.
 2. Minimize degradation caused by windblown sand and acid rain.
- K. Resistance to Biological Factors:
1. Animals: Do not use materials that are attractive to or edible by animals or birds.
 2. Insects: Do not use materials that are edible by insects, unless access by insects is prevented.
 3. Wood: When wood is used, provide at least the protection recommended by AWPAs as contained in AWPAs U1.

3.05 OPERATION AND MAINTENANCE CRITERIA

- A. Comply with requirements of all utility provider and local authorities having jurisdiction.
- B. Space Efficiency: Minimize floor area required while providing specified spaces and space relationships, circulation and services areas required for functions.
- C. Energy Efficiency: Design and construct to minimize energy consumption while providing function, amenity, and comfort specified, in accordance with the code.
- D. Water Consumption: Minimize water consumption.
- E. Ease of Operation and Use:
 1. Intended operating personnel are personnel with a reasonable level of training for similar activities.
 2. Provide facility, equipment, and systems that are easily operated by intended personnel.
 - a. Space around Components: Working clearances and access routes as required by code and as recommended by component manufacturer.
 - b. Access: All mechanical and electrical equipment located to allow easy access. Provide access doors for equipment accessed through walls, partitions, or fixed ceilings.
 - c. Valves and Other Control Devices: Accessible handles, switches, control buttons; valve handles on top/upper side; chain or other remote operators where located out of normal reach above floor level in SU1 and SU2 spaces.
 3. Minimize the need for specialized training in operation of specific equipment or systems; identify all equipment and systems for which the manufacturer recommends or provides training programs.
 - a. Validation:
 - 1) Proposal: Type of operating personnel and amount of training required; identification

of each equipment item or system for which more than one day of training is required; identify source of data.

- 2) Design Development: Operating impact analysis, including identification of type and quantity of staff, tools, and supplies required; estimate of impact that aging materials will have on operating requirements; no cost calculations required; identify source of data.
 - 3) Construction Documents: Updated operating impact analysis, based on actual product selections.
4. Preparation for Use: Prepare services for use by testing appropriately for proper operation before start-up, eliminating operational anomalies, adjusting control systems for optimum operation, and demonstrating proper functioning.
- a. Validation:
- 1) Proposal: General outline of commissioning procedures and responsibilities of the parties.
 - 2) Design Development: Identification of systems and equipment to be tested and method of test.
 - 3) Construction Documents: Complete commissioning plan.
 - 4) Construction and Closeout: Commissioning reports.
5. Preparation for Operation: Provide assistance for the Employer/End User's preparations for operation, as follows:
- a. Demonstration of all services to Employer/End User personnel.
- b. Training Employer/End User personnel in the operation of all service systems.
- c. Validation:
- 1) Construction Documents: Schedule of demonstrations.
 - 2) Construction Documents: Training plan and schedule.
 - 3) Construction and Closeout: Documentation of training conducted.

F. Ease of Maintenance:

1. Minimize the amount of maintenance required.
2. Do not locate any equipment requiring maintenance on the roof, in attics, in crawl spaces, where access must be through attics or crawl spaces, or where access is not possible using removable panels or doors.
3. Light Levels: Provide adequate lighting for locating and maintaining equipment; emergency lighting for critical components.
4. Cleaning: Where not otherwise specified, design equipment mountings to allow easy cleaning

around, and under, equipment, if applicable, without crevices, cracks, and concealed spaces where dirt and grease can accumulate and with raised, closed bases for equipment mounted on the floor.

5. Equipment Enclosures: Provide removable access panels to allow cleaning.
6. Site Utilities: Record or mark locations of existing, abandoned, and new utility lines in such a manner that they can be easily located during and after completion of construction.
7. Piping Systems:
 - a. Piping Other Than Gravity Drains: Provide means of isolating convenient portions of piping system, so that small portions may be shut down leaving the remainder in operation and so that drainage of the entire system is not required to enable repair of a portion of it.
 - b. Piping: Entire systems drainable without disassembly of piping.
 - c. Above Ground Piping: Labeled to identify contents and direction of flow, each shut-off valve, each piece of equipment, each branch take off, and at 6 m maximum spacing on exposed straight pipe runs.
 - d. Equipment in Piping Systems: Each unit provided with a union or flanged connector at each pipe connection to allow easy removal.
8. Replaceability of Parts:
 - a. Parts Having Service Life Less Than That Specified for Element: Easily replaceable, without de-installation or de-mounting of the entire element, component, or equipment item.
 - b. Valves: Easily replaceable internal parts, eliminating necessity of removal of entire valve for repair.
 - c. Parts Availability: Readily available from stocking distributors within 80 km of project location.
9. Exceptions: Elements that do not meet the specified requirements for ease of maintenance may be used, provided:
 - a. They meet the specified requirements for ease of replacement of elements not required to have service life span equal to that specified for the project as a whole,
 - b. The service life expectancy analysis and life cycle cost Validation specified for service life are provided, and 3) Employer/End User's acceptance is granted.
- G. Ease of Replacement:
 1. Elements not required to have Expected Service Life Span Equal to that specified for the facility as a whole: Make provisions for replacement without undue disruption of building operation.
 2. Large Equipment: Provide doors and corridors large enough for removal of major pieces of equipment, such as, chillers and boilers.

PERFORMANCE SPECIFICATIONS

- H. Maintenance after Occupancy: Where maintenance service after occupancy is specified, such services are to be performed at no extra cost to Employer/End User.
1. Individual maintenance contracts will be between maintenance organization and Employer.
 2. Services will be included under Design-Build Contractor's contract with Employer.
 3. Maintenance Services: Examination at frequency consistent with reliable operation; cleaning, adjusting, and lubricating; replacement of parts whenever required, using parts produced by the original manufacturer.
 4. Maintenance Organizations: Approved by manufacturer and Employer; transfer or assignment of contracts without prior written consent of Employer not allowed.
- I. Allowance for Changes in Occupancy and Arrangement:
1. Office Spaces: Design for churn of at least 75 percent, requiring very frequent minor changes in location and workplace layout, as defined in ASTM E1692.
 - a. Size and Layout: So that relocation of individuals and small groups can be accomplished overnight with no disruption of work and no disruption of work of neighbors and no degradation of functionality or amenity.
 - b. Employer requires that operations staff be able to make such adjustments without technical help, with only a few days ordering/delivery time for new components.
 - c. Where fixed partitions are used to separate spaces, relocated partitions must be completely salvageable.
 - d. All spaces involved in changes described above include special air exhausts, special lighting, and special cooling which must be moved at the same time.
 2. Validation:
 - a. Preliminary Design: Method of accomplishing changes anticipated; degree of salvage anticipated.
 - b. Design Development: Incorporation of costs of anticipated changes into life cycle cost analysis.
- J. Air Distribution Efficiency: Provide duct construction in accordance with SMACNA HVAC Duct Construction Standards, based on the following:
1. Supply Duct Pressure Class: 500 Pa.
 2. Return Duct Pressure Class: 500 Pa.
- K. Ease of Use:
1. Design access to and working clearances around heating equipment as recommended by the manufacturer.
 2. Air Distribution: Provide terminal units with individual controls adjustable by occupant of space.

SECTION 1901 – ELECTRICAL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical: Provision and distribution of electrical power to operate all electrically-operated devices, including those included under other services and those provided separately by the Employer; artificial lighting to illuminate spaces and tasks, both interior and exterior, independent of reliance on natural light; and grounding systems; comprising the following elements.
- B. Electrical Energy Supply and Generation: Utility power sources, engine-generator systems, battery power systems, uninterruptible power supply systems and unit power conditioners.
 1. Electrical Power Source: Existing public utility.
- C. Service and Distribution: Service entrance equipment, distribution equipment, transformers, motor control equipment, service and feeder wiring (conductors and raceways), monitoring, safety and control equipment, and other elements required for a complete functional system. 1. Main Electrical Service: The utility will provide a service transformer to convert its distribution voltage to the building's utilization voltage.
- D. Branch Circuits: Branch circuit wiring and receptacles and other branch circuit wiring systems, comprising the following elements:
 1. Branch circuit breakers.
 2. Conductors and cable from panel boards to fixtures, wiring devices, and mechanical equipment.
 3. Raceways and boxes.
 4. Wiring devices, including, but not limited to, receptacles, floor boxes and plates, wall switches, wall dimmers, remote control switching devices, and wall plates.
- E. Special Grounding Systems: Elements for lightning protection, fence grounding, and raised access floor grounding.
 1. Lightning Protection on roof level to protect building and equipment.
- F. Cathode Protection: Supplementary corrosion prevention using cathode protection.
- G. Products: Where specific products are required or allowed, use products complying with the additional requirements specified elsewhere.

1.03 RELATED REQUIREMENTS

- Section 101 – Preliminaries
- Section 400 – Earthworks
- Section 2315 – Mechanical (HVAC)
- Section 2316 – Mechanical (Elevators)
- Section 2310 – Design Procedures and Validation Requirements
- Section 2321 - Electrical (Lighting)

- Section 2330 – ICT
- Section 2335 – Building Management System
- Section 2340 – Plumbing
- Section 2345 – Fire Suppression
- Section 2350 – Commissioning
- Section 2360 – Training
- Section 2370 – Handover Documentation
- RFP and End User Requirements (User Brief, Schedules, ICT, Security) Documentation

1.04 REFERENCE STANDARDS

- ANSI C37.13 – 2015 Standard For Low-Voltage AC Power Circuit Breakers Used In Enclosures
- ANSI C37.14 - 2015 Standard for DC (3200 V and below) Power Circuit Breakers Used in Enclosures
- ANSI C57.12.00 – 2010 Standard For General Requirements For Liquid-Immersed Distribution, Power, And Regulating Transformers
- ANSI C57.12.01 – 2015 Standard For General Requirements For Dry-Type Distribution And Power Transformers
- ANSI C63.12 – 2015 Standard Recommended Practice For Electromagnetic Compatibility Limits And Test Levels
- ANSI C80.1 - 2015 Electrical Rigid Steel Conduit
- ANSI C80.3 - 2015 Electrical Metallic Tubing - Steel (EMT-S)
- ANSI C80.6 - 2018 Electrical Intermediate Metal Conduit
- ASCE 7 - Minimum Design Loads for Buildings and Other Structures
- ASHRAE 90.1 - 2019 Energy Standard for Buildings except Low-Rise Residential Buildings
- ASHRAE Standard 202-2018 Commissioning Process for Buildings and Systems
- ICC IFC 2018-2021 International Fire Code
- IEEE 830 Recommended Practice for Software Requirements Specifications
- NFPA 70 – 2020 National Electric Code
- NFPA 72 – 2019 National Fire Alarm and Signalling Code
- NFPA 101 - 2021 Life Safety Code
- NFPA 110 – 2019-2022 Standard for Emergency and Standby Power Systems
- NFPA 111 – 2019-2022 Standard on Stored Electrical Energy Emergency and Standby Power Systems
- NFPA 780 – 2020 Standard for the Installation of Lightning Protection Systems
- Requirements of the OSH Authority in accordance with the OSH Act 2004 with amendments of 2006
- Requirements of the Trinidad and Tobago Fire Service (TTFS), Ministry of National Security of Trinidad and Tobago

PERFORMANCE SPECIFICATIONS

- Requirements of the Electrical Inspectorate Division, Ministry of Public Utilities of Trinidad and Tobago
- Trinidad & Tobago Electricity Commission Wiring for Light & Power 8th Edition
- Trinidad & Tobago Electrical Wiring Code Part 1 - Low Voltage Installations (TTS 171: Part 1: 2015)
- Trinidad & Tobago Electrical Wiring Code Part 2 - High Voltage Installations (TTS 171: Part 2: 2002)
- Trinidad & Tobago Electrical Wiring Code Part 3 – Renewable Energy Systems and Interconnection Requirements (TTS 171: Part 3: 2011)
- Workplace Design – Lighting of Indoor work places – Specification (TTS 611-2008)

PART 2 PRODUCTS

2.01 ELECTRICAL ENERGY GENERATION

A. Generator Sets: New and in place. The Contractor is to provide for during this contract.

2.02 SERVICE AND DISTRIBUTION

A. Secondary Service and Distribution Feeders:

1. Conduits:
 - a. Use one of the following:
 - 1) Below Grade: GRS conduit or PVC conduit.
 - 2) Exterior, Exposed: GRS conduit or PVC conduit.
 - 3) Interior, Exposed: IMC conduit.
 - 4) Interior, Concealed: IMC conduit.
2. Conductors:
 - a. Use one of the following:
 - 1) Aluminum.
 - 2) Copper.

B. Main Service Equipment:

3. Types of Equipment:
 - a. Use one of the following:
 - 1) Low voltage switchgear.
 - 2) Switchboards.

PERFORMANCE SPECIFICATIONS

- 3) Distribution panels.
- 4. Main Devices:
 - a. Use one of the following:
 - 1) Power circuit breakers.
 - 2) Molded case circuit breakers.
 - 3) Fused switches.
- C. Branch Circuit Panel boards:
 - 1. Bus bars:
 - a. Use one of the following:
 - 1) Copper.

2.03 BRANCH CIRCUITS

- A. Receptacle Cover Plates:
 - 1. Use the following:
 - a. Material and Finish: Metal, chrome plated.
- A. Receptacle types:
 - 1. Use the following:
 - a. One dedicated for clean and one dedicated for normal power.

2.05 SPECIAL GROUNDING SYSTEMS

- A. Lightning Protection Conductors:
 - 1. Use one or more of the following:
 - a. Stranded copper cable.
 - b. Solid copper strip.
- B. Lightning Protection Grounding Terminals:
 - 1. Use one or more of the following:
 - a. Solid copper ground rods.
 - b. Concrete encased electrodes located in or near footings.

PERFORMANCE SPECIFICATIONS

- c. Ground ring electrode in direct contact with earth.
- C. Lightning Protection Strike (Air) Terminals:
 - 1. Use one or more of the following:
 - a. Solid copper.
 - b. Hollow tubular copper.
 - c. Solid aluminum.

PART 3 DESIGN CRITERIA

3.01 BASIC FUNCTION

- A. Provide electrical power with the appropriate characteristics to operate all electrically operated devices, including those in other services.
 - 1. Capacity: Calculated in accordance with NFPA 70.
 - 2. General Receptacle System Voltage: 120 volts/3-phase/60 Hz.
 - a. Provide 240 volt/3-phase/60 Hz receptacles in the following locations:
 - 1) Baggage and Mail Scanner areas.
 - 2) Training center.
 - 3) Maintenance area.
 - 4) Server room.
 - b. Equipment Voltage: 480 volts/3-phase/60 Hz.
 - 3. Interior Distribution Transformers: As required to serve building circuits and equipment plus 20 percent spare capacity.
 - 4. Branch Circuit Panel boards: In accordance with code plus 20 percent spare capacity.
- B. Uninterruptible Power Supply: Provide uninterruptible power supply (UPS) system as follows:
 - 1. Telephone System: Transfer time of 0.0167 seconds (1 cycle).
 - a. Duration of 60 minutes.
 - 2. Computer Systems and Auxiliary Equipment: Transfer time of 0 seconds.
 - a. Duration of 240 minutes.
 - 3. Fire Alarm and Detection Systems: Transfer time of 0 seconds.
 - a. Duration as required by code.

PERFORMANCE SPECIFICATIONS

4. Configuration: Parallel redundant with automatic transfer from UPS power to normal power.
5. Validation:
 - a. Proposal: Listing of input/output voltage, types of load covered, and generic equipment characteristics.
- C. Distribution: Distribute electric power for equipment circuits, lighting circuits, receptacle circuits, and electrical utilization devices.
 1. Branch Circuits: Provide adequate electrical power and safe and efficient distribution from panel boards to lighting, wiring devices, equipment, and appliances, based on the project and end user requirements.
- D. Grounding: Provide grounding systems that:
 1. Provide protection from lightning strikes;
 1. Provide protection from shock due to overhead power transmission lines accidentally contacting metal fences.
 2. Reduce static electricity and transient and induced current in raised access flooring and electronic equipment cabinets, racks, and supports.
 3. Comply with applicable recommendations of IEEE 142 and IEEE 1100.
- E. Where electrical elements also must function as elements defined within another element group, meet the requirements of both element groups.
- F. Validation:
 1. Design Development: Single-line diagrams, showing feeder and equipment sizes; engineering calculations showing input- and output-side capacities and loads and sizes of distribution elements; required electrical room sizes.
 2. Construction Documents: Complete system details, riser diagrams, equipment characteristics, and calculations.
 3. Construction: Continuity test of wiring systems prior to functional performance testing.
 4. Construction and Closeout: Functional performance testing.

3.02 AMENITY AND COMFORT CRITERIA

- A. Accessibility: Comply with ADA Standards for Accessible Design.
- B. Convenience:
 1. Provide convenience receptacles at intervals no greater than 3 m along the base of all wall areas.
- C. Appearance:

PERFORMANCE SPECIFICATIONS

1. Conceal electrical conduit in walls and behind ceilings in the occupied spaces. See Section D for additional requirements.
2. Conceal grounding conductors and ground terminals wherever possible.

3.03 HEALTH AND SAFETY CRITERIA

A. Fire Hazard:

1. Provide branch circuit elements in compliance with code and that are UL listed or labeled.

3.04 DURABILITY CRITERIA

A. Expected Service Life Span:

1. Electrical:

- a. Power Distribution Equipment: Same as building service life.

1. Lightning Protection and Special Grounding Systems: Same as building service life.
2. Expected Service Life Span: Provide UPS systems which will last a minimum of 5 years in service without major repairs or operating expense
3. All Grounding Systems: Life of the building without requiring any more maintenance than annual inspection and minor repairs not more frequently than annually.

B. Electronic Equipment Protection: Provide a signal reference grid or plane for the entire raised floor area as high-frequency ground for electronic equipment.

1. Comply with recommendations of IEEE 1100.
2. Conductor Maximum Impedance: 23 ohms per 305 mm of ground conductor at frequency of 1 kHz.
3. Ground: Multi-point bonding to all metallic objects crossing grid, including structural elements within 1820 mm of grid.

3.05 OPERATION AND MAINTENANCE CRITERIA

A. Power Quality:

1. Uninterruptible Power Supply Systems:

- a. Current Distortion: Less than 10 percent total harmonic distortion with included filter.
- b. 125 percent for 10 minutes.

B. Load Characteristics:

- 1. Maximum Harmonic Current Distortion: Plus or minus 2 percent of design current.
- 2. Transient Suppression: Limit voltage transients below damage curve of the electrical system and connected equipment.

C. Energy Efficiency:

- 1. Comply with requirements of IEEE Standard 739.
- 2. Comply with requirements of ASHRAE 90.1.

D. Ease of Use:

- 1. Configuration: Design wiring and protective devices so that outages caused by local overloads do not affect unrelated areas or systems.
- 2. Provide main busway centrally located to minimize branch wiring runs.

E. Allowance for Change and Expansion:

- 1. Branch Circuits: Provide branch circuit wiring with sufficient capacity to accommodate future growth and renovation without major rewiring.
 - a. All Circuits: Limit design loads to a minimum of 60 percent of capacity permitted by code.

F. Ease of Maintenance:

- 1. Uninterruptible Power Supply Systems: Provide the following functions:
 - a. Maintenance Bypass: Provide a maintenance switch to transfer UPS loads to the standby generators.
 - b. Internal maintenance bypass.

3.06 WARRANTIES AND GUARANTEES

1. All Electrical systems inclusive of equipment and its associated accessories shall have a minimum warranty for a period of (2) two years against faulty workmanship including: installation defects and manufacturer's defects inclusive of the required maintenance to maintain such warranties. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the Design Build Contractor or his/her designated representative.
2. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of (2) two years commencing on Date of Substantial Completion with the option for extended warranties past the (2) two years.

SECTION 1902 – LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical: Provision and distribution of electrical power to operate all electrically-operated devices, including those included under other services and those provided separately by the Employer; artificial lighting to illuminate spaces and tasks, both interior and exterior, independent of reliance on natural light.
- B. Interior Lighting: Comprising the following elements:
 - 1. Luminaires for general illumination.
 - 2. Accent lighting.
 - 3. Illuminated exit signs.
- C. Exterior Area Lighting: General lighting of exterior spaces including roadways, driveways, walkways, parking areas, and recreation areas; comprising exterior luminaires, poles, standards, or other means of mounting the luminaires, power supply, and controls.
- D. Products: Where specific products are required or allowed, use products complying with the additional requirements specified elsewhere.

1.05 RELATED REQUIREMENTS

- Section 101 – Preliminaries
- Section 400 – Earthworks
- Section 2315 – Mechanical (HVAC)
- Section 2316 – Mechanical (Elevators)
- Section 2310 – Design Procedures and Validation Requirements
- Section 2320 - Electrical
- Section 2330 – ICT
- Section 2335 – Building Management System
- Section 2340 – Plumbing
- Section 2345 – Fire Suppression
- Section 2350 – Commissioning
- Section 2360 – Training
- Section 2370 – Handover Documentation
- RFP and End User Requirements (User Brief, Schedules, ICT, Security) Documentation

1.06 REFERENCE STANDARDS

- ANSI C63.12 – 2015 Standard Recommended Practice For Electromagnetic Compatibility Limits And Test Levels
- ANSI C80.1 - 2015 Electrical Rigid Steel Conduit
- ANSI C80.3 - 2015 Electrical Metallic Tubing - Steel (EMT-S)

PERFORMANCE SPECIFICATIONS

- ANSI C80.6 - 2018 Electrical Intermediate Metal Conduit
- ASCE 7 - Minimum Design Loads for Buildings and Other Structures
- ASHRAE 90.1 - 2019 Energy Standard for Buildings except Low-Rise Residential Buildings
- ASHRAE Standard 202-2018 Commissioning Process for Buildings and Systems
- ICC IFC 2018-2021 International Fire Code
- IEEE 830 Recommended Practice for Software Requirements Specifications
- NFPA 70 – 2020 National Electric Code
- NFPA 72 – 2019 National Fire Alarm and Signalling Code
- NFPA 101 - 2021 Life Safety Code
- Requirements of the OSH Authority in accordance with the OSH Act 2004 with amendments of 2006
- Requirements of the Trinidad and Tobago Fire Service (TTFS), Ministry of National Security of Trinidad and Tobago
- Requirements of the Electrical Inspectorate Division, Ministry of Public Utilities of Trinidad and Tobago
- Trinidad & Tobago Electricity Commission Wiring for Light & Power 8th Edition
- Trinidad & Tobago Electrical Wiring Code Part 1 - Low Voltage Installations (TTS 171: Part 1: 2015)
- Trinidad & Tobago Electrical Wiring Code Part 2 - High Voltage Installations (TTS 171: Part 2: 2002)
- Trinidad & Tobago Electrical Wiring Code Part 3 – Renewable Energy Systems and Interconnection Requirements (TTS 171: Part 3: 2011)
- Workplace Design – Lighting of Indoor work places – Specification (TTS 611-2008)

PART 2 PRODUCTS

2.01 LIGHTING

A. Interior & Exterior Lighting:

1. Use the following LED types:

- a. Direct lighting units.
- b. Semi-direct lighting units.
- c. General diffuse lighting units
- d. Direct-indirect lighting units.
- e. Semi-indirect lighting units.
- f. Indirect lighting units.

B. Emergency Lighting:

1. Use one of the following types:
 - a. Self-contained LED battery-powered lighting units.

PART 3 DESIGN CRITERIA

3.01 BASIC FUNCTION

- A. Provide electrical power with the appropriate characteristics to operate all electrically operated devices, including those in other services.
 1. Capacity: Calculated in accordance with NFPA 70.
 2. Lighting (General, Interior & Exterior) System Voltage: 120 - 277 volts/1-phase/60 Hz.
- B. Lighting: Provide artificial means of lighting interior and exterior spaces.
 1. Interior Lighting: Provide artificial lighting for all interior spaces that is adequate in quality and distribution for the performance of tasks typical for the type of space and the characteristics of the intended population, regardless of the availability of natural light.
 2. Accent Lighting: In addition to general and task illumination, provide lighting on architectural features, displays, and artwork in focal areas to produce luminances that are within the range of 5:1 with respect to ambient background.
- C. Where electrical elements also must function as elements defined within another element group, meet the requirements of both element groups.
- D. Validation:
 1. Design Development: Single-line diagrams, showing feeder and equipment sizes; engineering calculations showing input- and output-side capacities and loads and sizes of distribution elements; required electrical room sizes.
 2. Construction Documents: Complete system details, riser diagrams, equipment characteristics, and calculations.
 3. Construction: Continuity test of wiring systems prior to functional performance testing.
 4. Construction and Closeout: Functional performance testing.

3.02 AMENITY AND COMFORT CRITERIA

- D. Accessibility: Comply with ADA Standards for Accessible Design.
- E. Artificial Light Levels: Provide maintained ambient illuminance values for various activities based on the primary visual tasks to be accommodated and that are within the ranges specified in the IESNA Lighting Handbook
 - 1. Emergency Lighting: In addition to exit signs and means of egress lighting, provide emergency illumination of not less than 10 lux for a minimum of 1 hour in spaces as follows:
 - a. Computer room.
 - b. Lobby.
 - c. Control room.
 - d. Emergency generator room.
 - 2. Interior Lighting: Not less than the following, when measured at task height:
 - a. Category A (Public spaces where reading and visual inspections are performed only occasionally): General lighting throughout space of 30 lux.
 - b. Category B (Lobbies and other spaces characterized by short stays and the need for simple orientation): General lighting throughout space of 50 lux.
 - c. Category C (Working spaces where simple visual tasks are performed): General lighting throughout space of 100 lux.
 - d. Category D (Spaces requiring performance of visual tasks of large size and high contrast): Task illumination of 300 lux.
 - e. Category E (Spaces requiring performance of visual tasks of high contrast and small size, or low contrast and large size): Task illumination of 500 lux.
 - 3. Local Interior Lighting: In spaces where local task lighting is used to achieve maintained luminance levels, maintain balance with ambient illumination such that general lighting for space provides not less than 20 percent of local lighting level.
- F. Artificial Light Quality: Provide luminous environment in each space that is designed to complement the functions and the character of the space.
 - 4. Interior Lighting:
 - a. Distribution: In keeping with geometry of space and location of visual tasks.
 - b. Visual Comfort: Provide lighting systems with the following characteristics:
 - 1) VCP: Visual Comfort Probability (VCP) of not less than 70.
 - 2) Luminance Ratio: Maximum luminance of luminaire does not exceed average luminance by ratio of more than 5:1 at 45, 55, 65, 75, and 85 degrees from nadir for crosswise and lengthwise viewing.

- 3) Maximum luminances of luminaires crosswise and lengthwise do not exceed the following values:
 - (a) 45 degrees above nadir: 7710 cd/sq m.
 - (b) 55 degrees above nadir: 5500 cd/sq m.
 - (c) 65 degrees above nadir: 3860 cd/sq m.
 - (d) 75 degrees above nadir: 2570 cd/sq m.
 - (e) 85 degrees above nadir: 1695 cd/sq m.

- c. Color of Light: Appropriate for functions accommodated in space and characteristics of interior finishes.

G. Appearance:

1. Conceal electrical conduit in walls and behind ceilings in the occupied spaces.
2. Character of Lighting Fixtures: Coordinated with architecture and other building systems and appropriate to finish level.

3.03 HEALTH AND SAFETY CRITERIA

A. Fire Hazard:

1. Provide branch circuit elements in compliance with code and that are UL listed or labeled.

3.04 DURABILITY CRITERIA

A. Expected Service Life Span:

- 1 Lighting Fixtures: Minimum 10 years.

B. Electronic Equipment Protection: Provide a signal reference grid or plane for the entire raised floor area as high-frequency ground for electronic equipment.

1. Comply with recommendations of IEEE 1100.
2. Conductor Maximum Impedance: 23 ohms per 305 mm of ground conductor at frequency of 1 kHz.
3. Ground: Multi-point bonding to all metallic objects crossing grid, including structural elements within 1820 mm of grid.

3.05 OPERATION AND MAINTENANCE CRITERIA

A. Power Quality:

PERFORMANCE SPECIFICATIONS

1. Lighting Systems:

- a. Current Distortion: Less than 10 percent total harmonic distortion with included filter.
- b. Power Factor equal to or more than 90%

B. Energy Efficiency:

- 1. Comply with requirements of IEEE Standard 739.
- 2. Comply with requirements of ASHRAE 90.1.

C. Ease of Use:

- 1. Configuration: Design wiring and protective devices so that outages caused by local overloads do not affect unrelated areas or systems.
- 2. Provide main busway centrally located to minimize branch wiring runs.

D. Allowance for Change and Expansion:

- 1. Branch Circuits: Provide branch circuit wiring with sufficient capacity to accommodate future growth and renovation without major rewiring.
 - a. All Circuits: Limit design loads to a minimum of 60 percent of capacity permitted by code.

E. Ease of Cleaning:

- 1. Interior Lighting: Provide luminaires that do not collect dirt rapidly and are readily cleanable.
 - a. Luminaire Categories: Provide luminaires of IESNA Category I, II, or V, for minimum dirt accumulation and LDD factors.

F. Ease of Maintenance:

- 1. Re lamping: Provide luminaires designed for easy re lamping with special tools.

3.06 WARRANTIES AND GUARANTEES

1. All Lighting components and systems inclusive of equipment and its associated accessories shall have a minimum warranty for a period of (3) years against faulty workmanship including: installation defects and manufacturer's defects inclusive of the required maintenance to maintain such warranties. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the Design Build Contractor or his/her designated representative.
2. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of (3) three years commencing on Date of Substantial Completion with the option for extended warranties past the (3) three years.

SECTION 2001 – ICT

PART 1 GENERAL

SCOPE OF THE WORKS

THE ICT REQUIREMENTS FOR THE PROJECT ARE INCLUDED IN THE RFP and END USER’S REQUIREMENTS.

1.01 SECTION INCLUDES

A. Communications services comprise the following:

1. Voice and Data: Infrastructure for voice and data transmission equipment and accessories.
2. Sound Reinforcement: Public address and music systems.
3. Television: Television distribution, reception, and equipment.

B. Provide internal wiring and outlets; a minimum of one outlet in each room, two incoming lines.

B. Products: Where specific products are required or allowed, use products complying with the additional requirements specified elsewhere.

1.02 RELATED REQUIREMENTS

- Section 101 – Preliminaries
- Section 400 – Earthworks
- Section 2310 – Design Procedures and Validation Requirements
- Section 2350 – Commissioning
- Section 2360 – Training
- RFP and End User Requirements (User Brief, Schedules, ICT, Security) Documentation

1.03 REFERENCE STANDARDS

- ANSI C63.12 – 2015 Standard Recommended Practice For Electromagnetic Compatibility Limits And Test Levels
- ANSI C80.1 - 2015 Electrical Rigid Steel Conduit
- ANSI C80.3 - 2015 Electrical Metallic Tubing - Steel (EMT-S)
- ANSI C80.6 - 2018 Electrical Intermediate Metal Conduit
- ASCE 7 - Minimum Design Loads for Buildings and Other Structures
- ASHRAE 90.1 - 2019 Energy Standard for Buildings except Low-Rise Residential Buildings
- ASHRAE Standard 202-2018 Commissioning Process for Buildings and Systems
- IEEE 830 Recommended Practice for Software Requirements Specifications
- NFPA 70 – 2020 National Electric Code
- NFPA 101 - 2021 Life Safety Code
- NFPA 110 – 2019-2022 Standard for Emergency and Standby Power Systems

PERFORMANCE SPECIFICATIONS

- NFPA 111 – 2019-2022 Standard on Stored Electrical Energy Emergency and Standby Power Systems
- NFPA 780 – 2020 Standard for the Installation of Lightning Protection Systems
- TIA-568-C - Commercial Building Telecommunications Cabling Standard; Rev C, 2012, and latest addenda.
- TIA-569-C - Commercial Building Standard for Telecommunications Pathways and Spaces; Rev C, 2012 (with Addenda; 2013).
- Requirements of the OSH Authority in accordance with the OSH Act 2004 with amendments of 2006
- Requirements of the Trinidad and Tobago Fire Service (TTFS), Ministry of National Security of Trinidad and Tobago
- Requirements of the Electrical Inspectorate Division, Ministry of Public Utilities of Trinidad and Tobago
- Trinidad & Tobago Electricity Commission Wiring for Light & Power 8th Edition
- Trinidad & Tobago Electrical Wiring Code Part 1 - Low Voltage Installations (TTS 171: Part 1: 2015)
- Trinidad & Tobago Electrical Wiring Code Part 2 - High Voltage Installations (TTS 171: Part 2: 2002)
- Trinidad & Tobago Electrical Wiring Code Part 3 – Renewable Energy Systems and Interconnection Requirements (TTS 171: Part 3: 2011)

PART 2 PRODUCTS

2.01 OWNER-FURNISHED PRODUCTS

A. The following items are to be provided by End User:

1. End User's operational computer network hardware and software.
2. Television sets.
3. Television reception and distribution equipment.
4. Video projectors.
5. Video recorders.

A. Owner-Furnished Items: Performance requirements that specify characteristics of equipment items do not apply; requirements for accommodating items to the project do apply.

2.02 COMMON COMPONENTS

A. Communication Cabling:

Use one of the following:

- a. Ethernet cable: CAT 6A.
- b. Fiber optic cable: Single and multimode OM3 minimum.
- c. Backbone Cable: minimum OM3 multimode fiber optic.
- d. Distribution Cable: minimum OM3 multimode fiber optic.

PART 3 DESIGN CRITERIA

3.01 BASIC FUNCTION

- A. Voice: Provide means of conveying voice communication between rooms and spaces in the building and between the building and the Employer's telephone network provider as specified in the program and as follows.
 - 1. Point-to-Point Voice Communications For:
 - a. Private two-way verbal communication.
 - b. Group conversations among more than 2 stations, at user's option.
 - c. Both handset and speaker operation, at user's option.
 - d. Transfer of live call to another station, at user's option.
 - 1. Connection between internal communications and public telephone system; 2 incoming lines.
- B. Data: Provide means of conveying data between computers within the building, outside the building where applicable within the site, and between the data transmission network and the End User's Internet service provider/s as specified in the program and as follows.
- B. Sound Reinforcement: Provide the following sound reinforcement functions:
 - 1. Sound transmission to all locations in the facility.
 - 2. Alarm notifications required by code, including pre-recorded emergency messages, user-recorded messages, and live announcements.
 - 3. Speaker Outlets: Required in the following spaces as per RFP and End User requirements documentation.
- C. Television: Provide the following television/cable reception and distribution functions:
 - 1. Incoming broadcast television; internal distribution over cabling not broadcast.

PERFORMANCE SPECIFICATIONS

2. Cable television reception, via provider hard connection.
3. Video/Audio Outlets: Required as specified in End User requirements documentation
 - a. Cafeteria and dining rooms, one for each 20 seats.
 - b. Waiting rooms, one each.
 - c. Conference rooms, one each.
 - d. Video outlet at optimum projection location for each specified projection surface, audio outlet near screen.
- D. Where communications elements also must function as elements defined within another element group, meet the requirements of both element groups.
- E. Where services elements are located outside the building in the site area, meet applicable requirements of RFP and End User Requirements documentation.
- F. Validation:
 1. Preliminary Design: Outline description of systems, inter-system interfaces, and functions provided.
 2. Construction Documents: Detailed layout of input and output device locations.
 3. Construction: Testing of wiring systems for continuity, prior to functional performance testing.
 4. Closeout: Complete functional performance testing.

3.02 HEALTH AND SAFETY CRITERIA

- A. Electrical Hazards: Design in accordance with all NFPA standards that apply to the occupancy, application, and design.
 1. Control access to spaces housing electrical components and allow access only by qualified personnel.
 2. Comply with NFPA 70 requirements for hazardous locations applications.

3.03 DURABILITY CRITERIA

- A. Expected Service Life Span: Minimum 15 years.
- B. Moisture Resistance and Thermal Compatibility: Materials that will resist degradation and failure of signals under ambient conditions expected.

3.04 OPERATION AND MAINTENANCE CRITERIA

- A. Power Supplies:

PERFORMANCE SPECIFICATIONS

1. Building power with power line conditioner for all systems.
 2. Dedicated Battery Backup Power: For:
 - a. Emergency communications, 90 minutes.
- B. Power Consumption and Efficiency:
1. Comply with requirements for energy efficiency of electrical equipment in ASHRAE 90.1.
- C. Transmission Capacity:
1. Within Buildings:
 - a. Sound Communication Cabling: 10 megabits per second; RJ45 connectors.
 - b. Data and Combined Data/Sound Communication Cabling: 100 megabits per second; RJ45 connectors.
 - c. Visual Communication Cabling: Coaxial 75 ohm, plus 2 dB, 100 percent shielded.
- D. Ease of Maintenance: Provide communications networks that are logically arranged and well-marked, using terminal panels that provide:
1. Connections between each voice station and hub in server room.
 2. Point-to-point connections between each data input and output point and hub location in server room.
 3. Connections between each sound input/output station and hub in server room.
- E. Allowance for Change and Expansion:
1. Spare Distribution Capacity: 10 percent, minimum.
 2. Future Distribution Capacity: 40 percent, minimum.
- F. Employer Personnel Training:
1. Operational: Minimum of 8 hours, for 2 persons, for each separate system.
 2. Maintenance: Minimum of 8 hours, for 2 persons, for each separate system.

3.05 WARRANTIES AND GUARANTEES

1. All ICT components and systems inclusive of equipment and its associated accessories shall have a minimum warranty for a period of (2) years against faulty workmanship including: installation defects and manufacturer's defects inclusive of the required maintenance to maintain such warranties. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the Design Build Contractor or his/her designated representative.
2. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official for a minimum of (2) two years commencing on Date of Substantial Completion with the option for extended warranties past the (2) two years.

SECTION 2200 – PURPOSE MADE JOINERY & CARPENTRY

5.0 GENERAL

1.07 DESCRIPTION

2. This section includes purpose made joinery and built in cabinetry required for the completion of the facility in keeping with the design requirements.

1.02 SCOPE

The works to be completed under this section shall include all labour, equipment, plant and materials necessary to furnish and install the following purpose made joinery and carpentry:

1. Cabinetry
2. Vanities
3. Cabinet doors
4. Shelves
5. Drawers
6. Base and Wall Unit Carcasses and Frames
7. Laminate
8. Countertops
9. Washroom partitioning
10. Wooden Louvers

1.03 PRODUCTS

This section may include a combination of the following products/ elements:

1. Timber: Timber products shall be sound with reasonably straight grain and at least 85% heartwood, free from large shakes, wavy edges splits, loose or dead knots, worm, rot, fungus, decay or infestation.
2. Pitch Pine:
 - a. Pitch pine shall be best imported quality of mature growth, free from gross defects, well-seasoned
 - b. It should have a minimum density of 673 kgs/m³ and an average equilibrium moisture content of 10% in accordance with BS EN 942:2007 - Timber for workmanship in joinery - Specification for Timber.
3. Hardwood:
 - a. Where 'hardwood' is specified this shall be either Cedar, Mahogany, Apamate, Cypre or Greenheart and shall be the best quality available and be pressure treated and must be free from gross defects.
 - b. The Contractor must exercise care in selecting all timber and shall notify the Architect with regard to the type and sources of the hardwoods he proposes to use and provide samples for approval prior to purchase.
4. Treated Timber:
 - a. Softwood and hardwood timber shall be treated against termite (and other) attack and decay damage by Wolmanising or similar pressure/vacuum impregnation with an approved preservative in order to obtain a minimum net chemical retention of 8.01 kgs/m³ of timber in accordance with the manufacturer's instructions and thereafter either air dry or kiln dry all timber to the best practice standards.
 - b. Treat all cut surfaces after pre-treatment with surface applied preservative against wood borer attack and against decay by rot or fungus.
5. Plywood:
 - a. Plywood shall conform to BS EN 635-2 & BS EN 635-3 – Plywood classification by surface appearance Hardwood/ Softwood
 - b. Marine plywood shall conform to BS 1088 – Marine Plywood Requirement.

- c. Where plywood is to have a natural or varnished finish, Grade 1 shall be used. Where plywood is to be painted, Grade 2 may be used.
 - d. All treated plywood should be further treated with surface application of preservative prior to finishing as an added precaution.
6. Plastic Laminate:
 - a. Plastic laminate shall be 1.2mm thick by 'Wilsonart' (or equal and approved by Architect)
 - b. It should comply with BS EN 438-1:1991-Decorative high pressure laminates (HPL) sheets based on thermosetting resins – Specifications
 - c. It should be bonded to plywood or timber backing with synthetic resin adhesive strictly in accordance with the manufacturer's printed instructions.
7. Solid Surface Countertops: Solid Surface Countertops shall be a minimum of 13mm / ½" thick
8. Glazing: Where cabinet doors are required to include glazing it shall 6mm thk. clear float glass with 10mm (3/8") dressed treated hardwood beads and appropriate sealant as required.
9. Lighting: Where lighting is specified within joinery elements the electrical components/ devices or accessories shall be tested by the Underwriters Laboratory (UL) and shall in compliance with NFPA 70 – The National Electrical Code (NEC) Handbook
10. Fixings: All fixings, plates, shoes or straps shall be formed from galvanized mild steel plate pre-drilled and/ or welded as necessary. Stainless steel (Type 316 L fixings) where requested or specified shall comply with BS EN 10051 – Continuously hot-rolled uncoated plate, sheet and strip of non-alloy and alloy steels. Tolerances on dimensions and shape.
11. Bolts, Nails and Screws:
 - a. The specification (i.e. type of fixing, diameter, material, length and gauge) and use of all nails and screws shall be in strict accordance with the relevant manufacturer's recommendations.
 - b. Annular ringed nails shall be used.
 - c. Screws are to be counter sunk into pre-drilled holes and pelleted with dowels in the matching timber to the surrounding joinery.
12. Concealed Cabinet Hinges: All cabinet hinges shall be fully concealed, self-closing 125 degree opening, satin stainless steel finished. A minimum of two (2) shall be supplied hinges per cabinet door.
13. Adhesives: Adhesives shall have a VOC content of less than 70 g/L
14. Frames:
 - a. Frames shall be constructed to conform to BS 1567 and BS 4748, Part 1.
 - b. Where frames are to be painted, they shall be primed on all faces prior to fixing.

1.04 DESIGN CRITERIA

1. Joinery Work: All joinery work shall be carried out in accordance with BS EN 942:2007 Timber in Joinery – General Requirements- Specification for Timber & BS 1186-2 Timber for workmanship in joinery - Specification for Workmanship.
2. Carpentry Work: All carpentry work shall be carried out in accordance with BS EN 1995-1-1:2004+A2:2014 – Eurocode 5: Design of timber structures. General. Common rules and rules for buildings
 - a. Joinery and carpentry works shall be executed in the best and most workmanlike manner.
 - b. Joints shall be so placed that knots do not occur in tension zones.
 - c. Frames shall be put together by mortise and tenon, dovetail or other suitable jointing methods
 - d. All workmanship to comply with BS 1186-2 Timber for workmanship in joinery - Specification for Workmanship.
3. Tolerances: All structural timbers shall be sawn timbers to the section given on the drawings. Permissible tolerance on cross section dimensions will be +6mm and -3mm with no allowance for wane.
4. Exposed Faces: Timber which is to be exposed in the finished work shall be 'dressed' unless otherwise described.

5. Nails: Nails, sprigs, etc., shall be punched below the surface; holes shall be stopped with putty or other equal and approved filler specially selected to match colour and texture of timbers which are to be polished.
6. Screws:
 - a. Screws (other than Grade 316L stainless steel screws with cups) shall be counter sunk head wood screws driven to 1/2" below the surface.
 - b. Screws heads for painting shall be stopped in putty or filler before any trace of rust appears
 - c. All rusted screws shall be replaced before painting.
7. Crossed tongued joints shall be glued.
8. Framed Joinery:
 - a. Joinery work described as 'framed' shall be jointed using mortise and tenon, combed or dovetail joints only.
 - b. Where joints are not specifically indicated they shall be the recognized forms of joints for each position.
9. Tolerances:
 - a. All structural timber shall be sawn timbers to the sections given on the drawings. Permissible tolerances on cross-section dimensions will be +/- 3mm (1/8") with no allowance for wane.
 - b. Reasonable tolerance shall be provided at all connections between joinery work and the building carcass to compensate for any irregularities, settlements or other movements.
10. Shrinkage: All joinery work shall be arranged, joined and fixed in such a manner that shrinkage in any part and in any direction shall not impair the strength and appearance of the finished work and shall not cause damage to adjoining material or structure.
11. Finishing of Cabinet Doors & Exposed Faces
 - a. All bevelled edges of tongues of panels in raised panel cabinet doors and other similar exposed joints shall be pre-finished with one (1) finishing coat of the prepared stain so that
 - b. In the event of shrinkage of the panel the material wood colour will remain concealed.
12. Surface Finish on Joinery: The surface finish on joinery shall be such that if properly finished with gloss paint, imperfections in manufacture will not be apparent.
13. Natural Finish: When natural finish or finish for staining, clear polish or varnishing is specified, the timber in adjacent pieces shall be selected and matched to be uniform and symmetrical in colour and grain.
14. Painted Joinery:
 - a. All joinery that is to be painted shall be knotted and primed with the primer before being fixed. This applies particularly to the 'covered up' or 'hidden parts of joinery work.
 - b. All external joinery work shall be put in a thick mixture of red or white lead and linseed oil or waterproof adhesive.
 - c. The arrangement, jointing and fixing of all joinery works shall be such that shrinkage in any part and in any direction shall be compensated in the joints and shall not impair the strength and appearance of the finished work and shall not cause damage to contiguous materials or structures.
 - d. All joinery components shall be pre-finished by spray- applied application off site and wrapped and brought on site protected from damage.
 - e. Pre-finished joinery components shall be unwrapped and installed on site.
 - f. Only final touch-ups are to be carried out on site.
15. Fixing to Block work or Concrete: Where timber is described as plugged allow for supplying and fixing wooden plugs treated with termite fluid. Alternatively, plugs may be an approved proprietary make. The use of any approved system of fixing to block work or concrete with special nails, screws or bolts, inserted with spring cartridges of power tools will be permitted in lieu of plugging.

2.00 APPLICATION

PERFORMANCE SPECIFICATIONS

1. This section includes purpose made joinery required for the facility that may include one or more of the following:
 - a. Washroom Vanities
 - b. Washroom Partitions
 - c. Kitchen Cabinetry
 - d. Countertops
 - e. Built in/ Purpose built furniture

3.00 PREFERENCES

3.01 SUBMITTALS

Contractors shall submit for approval:

1. Materials listing and certification indicating that products adhere to standard specifications.
2. Installation methodology
3. Specification/ Cut Sheets
4. Treatment Certificates are to be provided prior to the incorporation of timber into the works.
5. Mockups and samples as follows shall be provided prior to commencement of fabrication for the review and approval of the Architect.
 - a. The joinery sub-contractor shall provide one (1) sample of each joinery type
 - b. finished wood sample 150mm x 150mm
 - c. available laminate finish
 - d. countertop finish sample 150mm x150mm

3.23 QUALITY ASSURANCE

1. Contractors shall comply with local governing codes and regulations and contact all relevant statutory bodies before commencing construction.
2. All aspects of work covered in this specification shall be subject to inspection by the Engineer, or his/her representative.
3. The Contractor shall submit a schedule of his/her activities to the Engineer so that the Engineer will be able to work out his inspection program selectively.

3.03 SAFETY, SECURITY, OPERATIONS

1. Contractor shall provide Health and Safety documentation including a Health and Safety risk assessment and a Method Statement

3.03 FABRICATION, PROTECTION & DELIVERY

1. Fabrication: Fabrication of joinery components shall take place in an offsite location at a joinery shop.
2. Joinery Sub-contractor to cross check all as-built masonry openings for joinery items on site prior to fabrication.
3. Protection of Joinery Components: Each joinery component is to be wrapped in protective film and separated during transport to avoid bruising. Large frame components are to be filled with diagonal cross bracing to avoid warping.
4. Once delivered to site, joinery components are to be unwrapped and stored with a designated location uncovered and subject to free ventilation.

4.00 REFERENCED STANDARDS

1. BS EN 942:2007
2. BS 1186-2
3. BS EN 635-2 & BS EN 635-3
4. BS 1088.
5. BS EN 438-1:1991

PERFORMANCE SPECIFICATIONS

6. BS EN 10051
7. BS EN 1995-1-1:2004+A2:2014
8. NFPA 70

5.00 DURABILITY

1. Expected service life span: Same as facility as a whole. Minimum 50 years functional and aesthetic
2. Temperature endurance: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage

6.00 WARRANTIES, GUARANTEES AND MAINTENANCE

1. All joinery items shall have a warranty for a period of one year against faulty workmanship including: installation defects. The warranty excludes discoloration, stains caused by foreign substances, Acts of God (flood, wind, etc.), and modifications/ repairs done by anyone other than the contractor or his/her designated representative.
2. The Employer shall be furnished with an extended written guarantee by the joinery sub-contractor for a period of three (3) years against collapse, warping, twisting, swelling and splitting.



**Government of the
Republic of Trinidad and Tobago**

**Office Outfitting
P O L I C Y**

List of Abbreviations

ft	Feet (unit of measurement)
GoRTT	Government of the Republic of Trinidad and Tobago
m	Metre (unit of measurement)
mm	Millimetre (unit of measurement)
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Act
PRES D	Property and Real Estate Services Division



Symbols

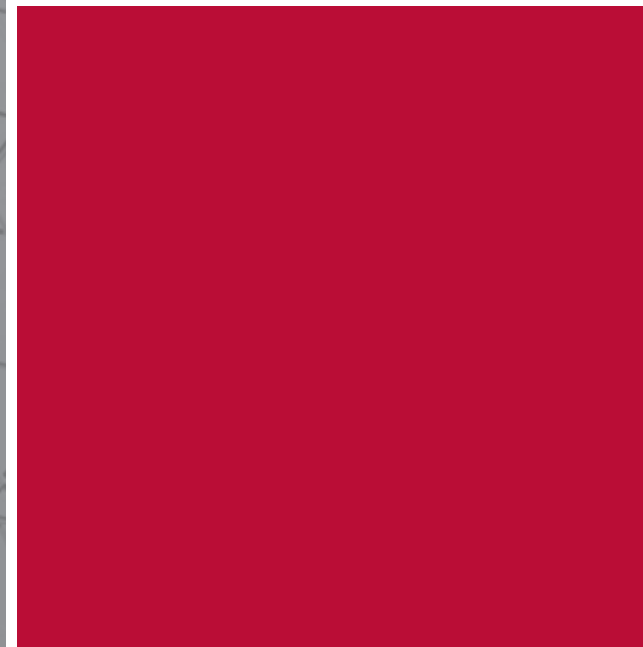


Environmental-friendly (green) information



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Government of the Republic of Trinidad and Tobago Office Outfitting Policy

1.0 SUMMARY

- 1.1 This policy outlines the requirements and standards related to the planning, design and fit-out of offices for the Government of the Republic of Trinidad and Tobago.
- 1.2 Where used in this policy, the term 'outfitting' refers to the planning, design and fit-out of constructed office space. This includes state-owned buildings constructed for the purpose of providing office accommodation as well as privately-owned buildings leased for that purpose. Outfitting refers to all finishes added to the building, from floor to ceiling, in all spaces (personal and support) being utilized by the employees.
- 1.3 'Support space' refers to space for functions other than workstations occupied by staff. This includes conference rooms, meeting and training rooms, filing areas, reception or waiting areas, utility bays, kitchens, bathrooms etc. It does not include primary or secondary circulation space, basements, parking lots, etc.
- 1.4 In order to provide proper office accommodation for its employees, the Government of the Republic of Trinidad and Tobago needs to implement a policy which documents the requirements of a well planned office space. Not only must these offices be suitably sized to accommodate the number of occupants, but must be ergonomically designed, provide high indoor environmental quality, adhere to global best practice and meet with other user and statutory requirements.
- 1.5 A recent review has identified the most common defects in government office accommodation as:
 - i. Inconsistency in outfitting across the government, which leads to;
 - Varying spaces being assigned to employees with the same position or rank
 - Different types of finishes
 - Selection of inappropriate materials and,
 - Varying outfitting costs.
 - ii. Inconsistency in facilities offered to staff,
 - iii. Challenges in dealing with landlords due to the lack of common standards for buildings

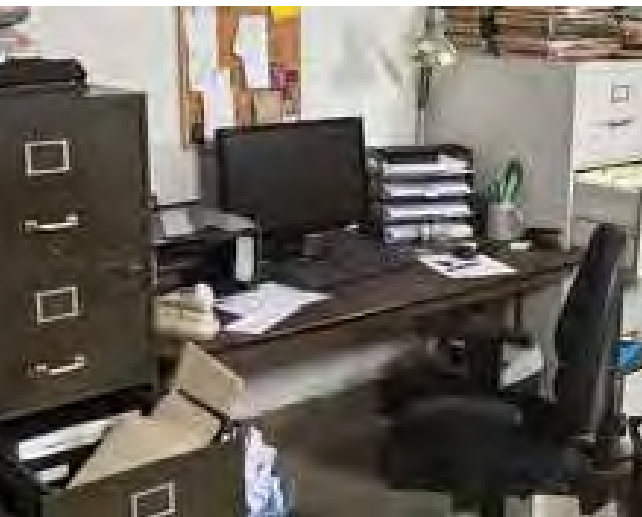


“In order to provide proper office accommodation for its employees, the Government of the Republic of Trinidad and Tobago needs to implement a policy which documents the requirements of a well planned office space.”





“Without a set of guidelines to properly steer the outfitting process, Government will continue to experience suboptimal levels of productivity and efficiency of its staff, which translates into poor customer service, while incurring unusually high outfitting costs, and, in many instances, breaching health and safety codes, exposing the government to litigation from employees, as well as the public.”



- iv. Inefficient use of space, e.g. where several offices are over-dimensioned while others can barely accommodate staff and their necessary equipment.
- v. Overcrowding and a lack of fundamental support spaces,
- vi. Lack of OSHA compliance within the building,
- vii. Staff comfort and efficiency being compromised as a result of poor design
- viii. Client comfort and the impact of workspace layout on service delivery, not being considered and,
- ix. A failure to cater for the differently abled.

- 1.6** Without a set of guidelines to properly steer the outfitting process, Government will continue to experience suboptimal levels of productivity and efficiency of its staff, which translates into poor customer service, while incurring unusually high outfitting costs, and, in many instances, breaching health and safety codes, exposing the government to litigation from employees, as well as the public.
- 1.7** This policy is intended to ensure a more standardized approach to the design of office spaces for use by the Government of the Republic of Trinidad and Tobago, resulting in appropriately outfitted office spaces which meet user and statutory requirements, and which increase the economic return on the outfitting investment.

2.0 CONTEXT

- 2.1** The fit-out of the office workplace has a shorter life cycle compared to that of major capital assets such as buildings, roads and dams. Whereas the latter may have life spans of 30 years or more before refurbishment or adaptation, office fit-outs have a shorter physical life of up to 15 years, but are likely to be adapted and reconfigured several times during that period.
- 2.2** It is therefore important to ensure that, not only is the initial outfitting investment appropriate, functionally and financially, but also that the fit-out is designed and constructed for adaptability and functional change in the most timely and cost effective manner. This is where proper planning plays a fundamental role.
- 2.3 Legal Context**

The importance of health and safety at work cannot be overstated. The employer has both a moral and legal obligation to ensure that employees work in a safe and healthy environment. The Occupational Safety and Health (OSH) Authority, is responsible for developing health and safety regulations in Trinidad and Tobago and monitoring to ensure compliance with same. As a requirement, all agencies,

be they state or privately owned, must adhere to the regulations laid out in the OSH Act. (See OSH Act 1. 2004 as amended (2006) Building codes, regulation standards, best practices, codes of practices as applicable). This policy ensures compliance with the relevant clauses of the OSH Act. Through its planning, design and fit-out requirements, it helps to create a work environment which is safe and healthy, adequately sized to comfortably accommodate employees, clients and all necessary support spaces, and which is ergonomically sound. This, in turn, prevents the appearance of clutter and blockage of primary exits amongst other health and safety breaches.

2.4 Impact on productivity

Although office layout is not the sole factor which affects productivity in the work environment, it does play an important role. Various studies have shown that proper office design can increase employee performance. Furniture, noise, flexibility, comfort, communication, lighting, temperature and air quality are listed as some of the most influential factors. In recent years, government agencies have experienced a rise in complaints of 'sick buildings', with cluttered and confined working areas, unergonomic furniture, inadequate lighting, poor air quality and other factors being the main symptoms. This has resulted in several offices allowing staff to work half-day shifts on a regular basis; and in the height of industrial action, employees have evacuated buildings. All of these factors contribute to a decline in productivity and have a negative impact on service delivery.

2.5 Aspect of service delivery/impact on client

This leads us to examine the impact, both direct and indirect that office design has on employees and clients. Inappropriate office layouts and environments affect employees' levels of comfort and job satisfaction, causing many of them to become disgruntled. This then impacts the timeliness, efficiency and courtesy of service delivery. Customers too may be directly affected by the office environment. Poor conditions in the space used to interact with clients, as well as spaces that are not equipped to accommodate the differently abled, compromise the comfort factor of clients. This, coupled with poor service, can cause these clients to be dissatisfied, and to become abusive to staff causing further discontent to staff.

All of these factors underscore the need for a policy on outfitting.



“Although office layout is not the sole factor which affects productivity in the work environment, it does play an important role. Various studies have shown that proper office design can increase employee performance”





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3.0 PURPOSE

3.1 This policy aims to provide requirements and guidance on:

- planning for the outfitting process,
- designing your office layout,
- outfitting the office space,
- utilizing that space effectively and,
- managing the accommodation-change process.

3.2 The objective of this policy is to ensure the outfitting of GoRTT offices in a manner which:

- i. is safe, healthy and legislatively compliant;
- ii. caters to the differently-abled;
- iii. is functional, cost and space-effective;
- iv. is consistent, equitable and sustainable;
- v. is adaptable to new ways of working and technology;
- vi. supports organizational reconfiguration and;
- vii. reduces the occurrence of state funded additions to buildings becoming landlord fixtures.

3.3 This policy is complemented by Standards, both national and internationally based, which provide further outfitting guidance. Refer to Appendix II.

4.0 SCOPE

4.1 This policy applies to **office accommodation** which comprises:

- i. Workspaces in which the tasks or activities performed require standard height and sized desks and chairs;
- ii. Support spaces which include conference and meeting rooms, training rooms, lunch rooms, washrooms, document centres and generic reception areas.

The office accommodation in this policy does not include:

- i. Special purpose workplaces such as schools, hospitals, police stations, airports, bus stations, etc.;
- ii. Workspaces in which the tasks or activities performed require specialised furniture, such as laboratories, drawing offices, marriage rooms, etc.;
- iii. Customer service areas with teller styled counters and cashier counters;
- iv. Vaults and other storage rooms;
- v. Server and telecommunications rooms;
- vi. Other workspace support areas, e.g. child care centres and recreational areas
- vii. Car parks.

4.2 This policy applies to newly acquired office space that is in the process of being outfitted, and offices that are to be refurbished.

4.3 It applies to outfitting of GoRTT offices from one-room spaces to entire buildings.

4.4 It does not apply to offices that are already outfitted and are currently in use. In such cases, those offices must ensure that they are in compliance with the OSH Act.

4.5 The policy relates to office accommodation for Ministries of the Government of the Republic of Trinidad and Tobago, as well as, Departments not under Ministerial control. This includes:

- i. All Government Ministries (refer to Appendix III for current list),
- ii. The Service Commissions Department including Statutory Authorities Service Commission,
- iii. The Personnel Department,
- iv. The Auditor General's Department.

These Ministries and Departments are hereinafter referred to as agencies.



“Although office layout is not the sole factor which affects productivity in the work environment, it does play an important role.”





“Planning plays a fundamental role in the outfitting of office space. It is the process of assessing an agency’s structure, functions and mode of operation to determine the space and other organizational needs, and using this information to create a functional and pleasing work environment.”



4.6 This policy does not apply to the following:

- i. The Tobago House of Assembly (THA),
- ii. Wholly Owned, Majority Owned and Minority Owned State Enterprises,
- iii. Statutory Boards and other Bodies,

4.7 This policy is applicable to GoRTT Office Spaces located in Trinidad and Tobago.

4.8 The policy may be used as a guideline by agencies of the State which do not depend upon the Property and Real Estate Services Division for the procurement of their accommodation.

5.0 TERMS AND DEFINITIONS

Appendix I provides definitions for the technical terms used throughout this policy.

6.0 PLANNING POLICY REQUIREMENTS

Planning plays a fundamental role in the outfitting of office space. It is the process of assessing an agency’s structure, functions and mode of operation to determine the space and other organizational needs, and using this information to create a functional and pleasing work environment. The following sections outline the policy requirements to be followed by all agencies in planning the layout of office space for occupation.

6.1 IDENTIFY NEEDS

As a first requirement in the planning process, agencies must determine what types of space they need.

6.1.1 A User Brief with a listing of employees in the current structure of the agency must be prepared. This listing must include all permanent establishment and contract staff. Outfitting should ideally be undertaken post a recent organizational structural review. Refer to User Brief Template in Appendix II.

6.1.2 If the nature of some jobs includes extensive field work or facilitates work-from-home, then plan for shared hot desks which these employees will sit at on the occasions that they are in office. The ratio of hot desks to officers should be determined based upon the expected frequency of office visits by these members of staff.

- 6.1.3 In addition to catering for planned increases in complement, the space requirement should include an additional 15-20% for future growth.
- 6.1.4 A listing of all existing support spaces at the current office location must then be made. To this, any additional support space that may not have existed in their current location, but which is required for the agency to carry out their duties, must be incorporated into the listing.
- 6.1.5 Other requirements must be within the building's floor loading, plumbing electricity, cooling and cabling capacity.

6.2 ESTIMATE SPACE

Having determined the types of space required, the next requirement is determining the sizes of these spaces.

- 6.2.1 All agencies must use the Office Space Standards, (refer to Appendix II), to calculate the space required for personal offices as well as support spaces.
- 6.2.2 In cases where agencies have already identified the space they wish to occupy, they must then ensure that the space is adequate. If it is not, it may be necessary to adjust their needs to suit the size of the space (where possible).

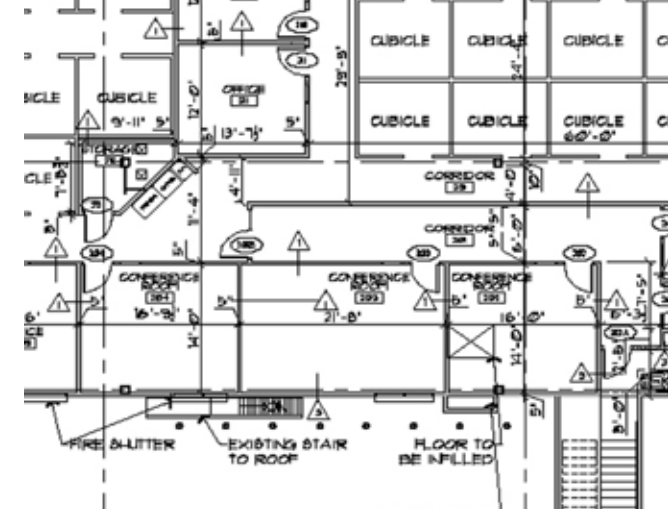
6.3 OTHER PLANNING

Develop other plans including but not limited to:

- 6.3.1 Change Management and Communication Plan- The plan which ensures that all stakeholders are effectively prepared for the change. Outfitting may occur as part of a holistic programme, bringing together initiatives in technology, documentation, working practices and culture change. Consider addressing records (document) management, clear desk policies, working environment protocols, security (entry and tracking) etc., in the Change Programme.
- 6.3.2 Project Management Plan- This plan ensures that the outfitting exercise is completed on time, within budget and to scope. Projects should use a Monitoring and Evaluation framework to ensure success at delivering intended benefits.

6.4 SECURE APPROVALS

Agencies are required to submit their User Brief and other plans to a relevant Accounting Officer and to PRES D for review and approval.



“Outfitting may occur as part of a holistic programme, bringing together initiatives in technology, documentation, working practices and culture change.”





“If the nature of some jobs includes extensive field work or facilitates work-from-home, then plan for shared hot desks which these employees will sit at on the occasions that they are in office.”



7.0 DESIGN POLICY REQUIREMENTS

The design phase of the outfitting process follows, having determined what types of spaces are required, and their dimensions. This involves the conceptualization of a layout, which satisfies the agency's needs in the space to be outfitted. This layout must be in response to and coordinate with the building shell and acknowledge the physical location and social context of the agency or its division. The design phase includes the development of floor plans, furniture layouts, ceiling plans (including lighting and air conditioning), mechanical, electrical and plumbing plans. The design should adhere to code and regulatory requirements and encourage principles of environmental sustainability. This section applies simple design principles to provide the policy requirements which help create a functional work environment.

7.1 OPEN PLAN DESIGN

With the change in working practices within the last few decades, government agencies now require spaces that support the contemporary working environment. Open plan designs are quickly replacing the traditional cellular-space allocation linked to grade rather than function. Open plan design considerations include;

7.1.1 All agencies shall design their layout using the Open Plan concept. Open Plan Design, reduces the number of enclosed or private offices, and in so doing:

- fosters improved communication and teamwork,
- allows for greater economic return as the tenant can vacate the space with demountable workstations and partitions more readily, there being fewer permanent structures,
- allows for increased energy efficiency through the use of natural lighting, and
- facilitates flexibility in workspace configuration, as needs change.

7.1.2 Enclosed offices shall be provided only for:

- Government Ministers, Parliamentary Secretaries;
- Permanent Secretaries, Heads of Departments, Chief Executive Officers and equivalent;
- Deputy Permanent Secretaries, Deputy Heads of Department, Deputy Chief Executive Officers and equivalent;
- Executive Directors/Heads of Divisions, and equivalent; and
- Deputy Directors and equivalent.

7.1.3 Enclosed offices may also be provided (other than for those listed above) where there is need for:

- Frequent confidential client interviews and other confidential matters
- Frequent staff counselling
- Extensive high level representational activities.

7.2 LOCATION OF SPACES

The location of spaces within the office floor plan should be well thought out and based on function. A carefully planned layout can increase productivity, team interaction and provide a safe working environment. The following are requirements specific to the determination of the location/placement of the various office spaces.

- 7.2.1** The placement of offices for key office holders must take into consideration the relevant security requirements.
- 7.2.2** Spaces to be utilized by the public shall be located close to the main entrance or on floors closer to the street access and spaces that contain information or items of value further away to lessen the security risk, e.g., a vault or a Minister's office. (Doors may be used to segregate these areas as long as they do not interfere with the main circulation flow).
- 7.2.3** Spaces shall be located and grouped based on function; e.g., keep departments that are closely related, close to or alongside each other.
- 7.2.4** Sections or small areas that are dependent on a larger section shall be located close to that larger section; e.g. a vault should be kept close to or within the accounts department; a pantry should be located within or close to the kitchen area etc.
- 7.2.5** Enclosed offices, or any enclosed space, shall be located to the core of the building, and those with shorter enclosures towards the perimeter of the space. The building's perimeter zone shall be used for open plan areas to maximize natural light and outlook. (This allows natural light to enter as much as possible into the entire office space and keeps the view open for the users of the space).
- 7.2.6** Noisy areas shall be isolated from the work environment, so as not to provide a distraction to employees, e.g. lunch and recreation rooms.
- 7.2.7** Prime office space shall be maximized i.e. spaces with favourable views. Spaces like pantries, other storage areas or any other rooms that are not frequently used, shall not be located in these areas.
- 7.2.8** Registries containing frequently used filing shall be located where they can be accessed with minimum disruption to work areas.



“The location of spaces within the office floor plan should be well thought out and based on function. A carefully planned layout can increase productivity, team interaction and provide a safe working environment.”





“All government agencies should make optimal use of space and natural resources. Through shared spaces and allowances for natural illumination and ventilation, agencies can reduce their energy consumption as well as maximise the space provided to them.”



7.3 OPTIMIZATION OF SPACE AND NATURAL RESOURCES

All government agencies should make optimal use of space and natural resources. Through shared spaces and allowances for natural illumination and ventilation, agencies can reduce their energy consumption as well as maximise the space provided to them. The following requirements guide in the optimization of space and natural resources.

- 7.3.1 Maximize the use of natural light by placing ceiling height offices around the building's core. 💡
- 7.3.2 Spaces and or rooms are to be shared whenever possible so as to support and/or adapt to multiple uses. Where possible, such rooms shall be sub divisible with operable walls to maximise flexibility, and be centrally maintained and booked. They may be fitted with glazed, regular or acoustic partitions depending on the privacy requirements.
- 7.3.3 Reception and waiting areas shall be compact, functional and shared whenever possible. (In cases where the agency occupies more than one floor, consider having a common reception and waiting area which caters for several floors rather than one on every floor. This may be on a lower floor for easier access via lifts or can be located on the ground floor).
- 7.3.4 Enclosed meeting rooms shall be provided to facilitate formal sessions, depending on the needs of the occupants and generic planning of the site. Such rooms shall be located away from the building's perimeter, to leave natural light available for open work points, and shall have at least one glazed wall, which may be treated if privacy is required.
- 7.3.5 Conference rooms shall have a central location within the building so as to be generally available.
- 7.3.6 A single conference room shall be provided for use by a Minister/Parliamentary Secretary and the Permanent Secretary and equivalent when possible.
- 7.3.7 In cases where there is a shortage of space a conference room for general use shall be located close to the Minister's/Parliamentary Secretary's office for use by the Minister/Parliamentary Secretary, the Permanent Secretary and equivalent and general staff.
- 7.3.8 Where possible, external training facilities should be considered instead of providing dedicated internal training spaces, except in cases where training is a core function of the agency.
- 7.3.9 Where internal training rooms are necessary they shall be used as multi-purpose conference/training facilities.

7.3.10 On site file storage should cater for only open and active or recently closed files, with archived files being stored at less expensive off site locations, in keeping with effective archival policy.

7.3.11 Storage space for office supplies shall cater to the immediate and short term needs of the agency with larger quantities of bulk supplies being stored at less expensive off site locations.

7.4 CIRCULATION SPACE

Circulation space is the path through workstations in an open plan, or the corridors between rooms in a closed plan. Circulation allows users to interact with and move through a building, and can be horizontal or vertical, consisting of primary and secondary circulation areas, and must meet the following requirements.

7.4.1 Circulation space shall occupy 14 - 21% of the entire floor area.

7.4.2 Circulation paths shall be clearly defined and free from obstruction in case of emergency, i.e. should be designed to cater to fire exits.

7.4.3 Main corridors shall, as far as possible, be straight/fluid lines that allow you to easily get to each main section or division in the building or office space.

7.4.4 Workstation openings shall be a minimum of 3ft.2in or 1m to allow wheelchair access.

7.4.5 Circulation space shall be consistent with fire safety legislation and the OSH Act, catering effectively to the differently abled.

7.4.6 Designed paths of travel for fire safety shall be maintained in the approved condition and configuration.

7.4.7 Any change to the office layout that affects the designated fire safety circulation must be resubmitted to the Chief Fire Officer for approval.

For more information refer to the Circulation Space Requirements in Appendix II.

7.5 DESIGNING TO PROMOTE COMMUNICATION AND SOCIAL INTERACTION

Government agencies should seek to promote interaction and increase communication amongst employees whenever possible. This can be accomplished through general office design, the location of support spaces and design elements which increase visibility within the office.

7.5.1 Support functions (such as storage, meeting areas, etc.) shall be planned as central connecting points within the space, to increase planning efficiency and encourage social interaction. Introduce informal seating to encourage informal interaction, networking, sharing and learning.



“Government agencies should seek to promote interaction and increase communication amongst employees whenever possible.”





“Fit-outs are to be designed within a building’s floor loading, plumbing, electrical, cooling and cabling capacity, and should ensure that air quality standards are maintained. Further, changes to a building’s structure can be costly so a proper cost-benefit analysis should be performed to ensure value for money..”



- 7.5.2 Lunchrooms shall cater for groups of four to eight at a table, with a few tables for two, for more private dining. They shall allow for more than one person to prepare their meal at a time.
- 7.5.3 A view panel around doors shall be used for enclosed spaces, e.g., managers’ offices. (This enables these team members to remain part of the work environment while providing acoustic isolation.)
- 7.5.4 Adherence to open plan design will allow for higher levels of visibility, promoting team work and social interaction among employees.
- 7.5.5 Utility bays shall be centralised on a given floor to allow the most equitable access and to avoid disruption to local work points. (Utility bays shall also provide seating and cupboards as required).
- 7.5.6 Team zones which are located outside of circulation zones shall have communications outlets available.

7.6 MINIMIZING IMPACT ON BUILDING’S STRUCTURE, FINISHES AND SERVICES

Fit-outs are to be designed within a building’s floor loading, plumbing, electrical, cooling and cabling capacity, and should ensure that air quality standards are maintained. Further, changes to a building’s structure can be costly so a proper cost-benefit analysis should be performed to ensure value for money.

- 7.6.1 Any facility or function that is inappropriate for office buildings (e.g. printeries, large scale binding operations, etc.) shall not be incorporated in the office layout.
- 7.6.2 Any functions or processes that affect a building’s approved use or compromise safety systems shall not be considered.
- 7.6.3 Built-in furniture and equipment that are fixed to floors, ceilings, core walls and external walls are to be kept to a minimum. Note that certain additions can become landlord fixtures.
- 7.6.4 Changes to the structure of the building shall **only** be allowed if deemed essential to the function of the agency and must be approved by a certified structural engineer, so as not to affect structural integrity.
- 7.6.5 Wet areas including additional toilet facilities, shall be designed around existing plumbing.
- 7.6.6 Existing walls shall be maintained whenever possible and the design shall be confined to the already established grid layout used within the space.

7.7 DESIGNING FOR STANDARDIZATION AND FLEXIBILITY

With change being a constant factor affecting the structure and functions of government agencies, more standardized and flexible layouts will allow agencies to quickly adapt to new working models.

7.7.1 All agencies shall incorporate generic planning in their designs i.e. modular space standards and standard mobile furniture and components that are transferrable from workstation to workstation shall be used.

7.7.2 Offices shall be furnished using workstation furniture to match open workstations.

7.7.3 Workstations shall be furnished with mobile furniture and those that are built specifically for right or left-handed use shall be avoided.

7.7.4 Fit-out elements are to be designed as separate layers that interconnect and can be disconnected and replaced/upgraded; e.g., technology and communications systems should be separable from furniture systems, visual and acoustic screening should be separable from furniture and technology systems.

7.7.5 Workstations should be equipped with powered panels and cable management systems.

7.7.6 Shared hot desks allow for a many-to-one relationship between employee and work station where officers spend less time in the office.

7.7.7 Storage and filing cabinets shall be modular in both width and height, and fit the chosen workstation system.

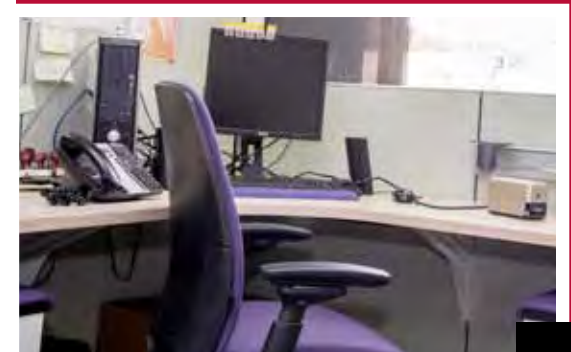
7.7.8 Raised floors or access flooring shall be utilized in designs when possible and practicable. Raised floors are utilized in order to:

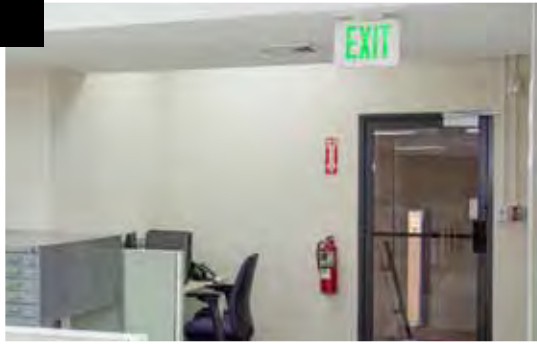
- reduce the appearance of unsightly cables,
- allow for flexibility in the configuration of the office layout; as the services come up through the floor, allowing furniture to be placed away from walls, and,
- provide a more cost-effective solution in the long-term; as they provide longer-term flexibility, in the face of the ever changing office needs.

Note: Raised flooring is not actually a finish but can be seen as part of the structure in a building. It is a feature that should be given thought to during the initial designing and construction phases of a building.



“All agencies shall incorporate generic planning in their designs i.e. modular space standards and standard mobile furniture and components that are transferrable from workstation to workstation shall be used..”





“Office layouts must be designed to meet best practice, legislative obligations and government policies such as workplace health and safety and accessibility.”



7.7.9 Customer service areas shall be designed to incorporate and/or adapt to new ways of service delivery and new technology.

7.8 DESIGNING FOR COMPLIANCE

Office layouts must be designed to meet best practice, legislative obligations and government policies such as workplace health and safety and accessibility (Refer to section 10).

Utilise the *EVENTS PLANNING: Guidelines for the Inclusion of Persons with Disabilities (2010)*, or *Guidelines for an Accessible Working Environment (2010)*, published by the Disability Affairs Unit of the Ministry of Social Development for further detailed guidance in designing.

7.8.1 Agencies must aim to avoid Architectural Barriers in the design of their office space, by providing the following:


- Ramps at all major entrances to buildings occupied by any government agency shall have a recommended slope of (5 to 8.3 percent) and must be made of non-skid material.
- At least one (1) bathroom which permits wheelchair access, and
- At least one (1) cubicle designed to accommodate persons with wheelchairs in offices where there is a high level of customer interface.


7.8.2 Office layouts should be designed to meet fire and other safety requirements per OSHA.

7.8.3 Office layouts must comply with the terms and conditions stated in lease/ rental agreement.


7.9 DESIGNING FOR SUSTAINABILITY


Agencies must aim for designs that are organizationally and ecologically sustainable, in keeping with international best practice. This includes energy, material and water.

7.9.1 Where possible cost effective energy saving options, especially in the areas of lighting, water and air conditioning shall be utilized. Equipment and new technologies shall be selected to optimize resource consumption. 

7.9.2 Designs shall promote organizational sustainability, which is an organization's capacity to minimize its carbon footprint and to promote cost effectiveness and organizational values. 

7.9.3 Agencies must ensure that designs comply with legislation related to Environmental Management. 

7.9.4 Agencies shall use ecologically sustainable products, materials and finishes where possible in fit-outs and maximize the efficient use of raw materials by considering standards, sizes and components. 

7.9.5 Ecologically sustainable practices shall be incorporated and formalized for fit-out maintenance and fit-out in use (e.g. energy management, waste management, sustainable cleaning products and procedures and sustainable maintenance practices.) 

7.10 SPECIFIC SPACE REQUIREMENTS

This section provides guidelines for the design of those additional spaces not covered under the previous sections or that may have specific space requirements that require special mention.

7.10.1 New en-suites (bathroom and/or toilets) shall not be provided except for Ministers/Parliamentary Secretaries and Permanent Secretaries.

7.10.2 Kitchenettes involving wet points (water supply and drainage) are restricted to lunchrooms and the offices of:

- Ministers/Parliamentary Secretaries
- Permanent Secretaries, Directors of Personnel Administration and Chief Personnel Officers.

7.10.3 Moveable kitchenettes i.e. non permanent fixtures shall be utilized, as building owners may require that all new en-suites and kitchenettes be removed when the tenancy is vacated.

7.10.4 Lunch rooms may differ in size according to the number of users. An estimate of 9-12ft² or 1-1.2m² shall be allotted to each user.

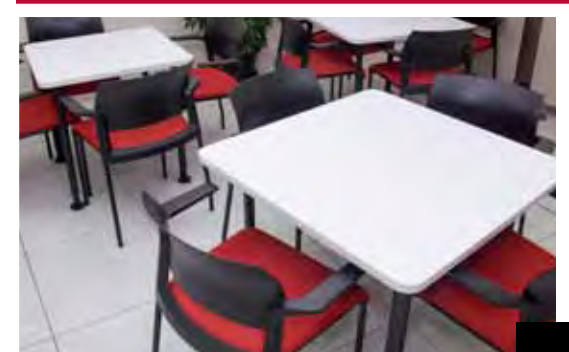
7.10.5 Lunchrooms shall be equipped with basic amenities, e.g.:

- A sink with drain board and running water;
- Cupboards and drawers for storage of foodstuff, cutlery and wares;
- Tables and chairs suitable for dining and,
- A refrigerator and microwave/ toaster oven.

Consider fire and other Health and Safety Requirements if including appliances with open flame



“Ecologically sustainable practices shall be incorporated and formalized for fit-out maintenance and fit-out in use (e.g. energy management, waste management, sustainable cleaning products and procedures and sustainable maintenance practices.”





“As a final requirement, agencies must also submit their outfitting budgets for approval by Cabinet. These must fall within existing benchmark targets specified by Cabinet.”



7.10.6 Registries shall be equipped with workstations for staff to sort documents and their own storage area for filing. (Where there is a need for a large storage area, mobile filing units are recommended. They provide safe and easy storage and can increase filing capacity by 75% when compared to bulky filing cabinets. They may be installed as long as the structural floor permits).

7.10.7 All bathrooms shall be equipped with ventilation; natural or artificial or both. There shall be allowances for vents/ducts to evacuate air.

7.10.8 All agencies shall provide at least one (1) sick bay per floor depending on the number of employees in the agency. (See OSH Act 1. 2004 as amended (2006)).

7.11 APPROVALS

Once government agencies have completed the proposed designs for their respective office spaces, the necessary approvals should be obtained to allow the outfitting works to proceed, ensuring compliance with statutory requirements.

7.11.1 At the end of the design phase, approvals of all plans/designs must be obtained from the relevant authorities, and where necessary, from landlords with respect to privately owned accommodation being leased or rented by a GoRTT agency. Plans/designs are also to be reviewed by the PRES D for compliance with this policy and for consistency across GoRTT.

7.11.2 As a final requirement, agencies must also submit their outfitting budgets for approval by Cabinet. These must fall within existing benchmark targets specified by Cabinet.

8.0 FIT-OUT POLICY REQUIREMENTS

Upon completion of the Design Phase, the next step is the fit-out of the space according to the designs. A critical aspect of this Fit-Out Phase is the selection of the finishes, fittings and fixtures. The materials chosen must be functional, enhance the quality of work, be aesthetically attractive, safe and environmentally-friendly and where possible, fire retardant. Office fit-out materials must be appropriate for government office accommodation and take into account life cycle cost factors, including capital cost, operating and maintenance costs, cost of making changes, as well as ecological sustainability and community expectations. The following sub-sections provide the requirements for the selection and use of materials used to fit out office space.

8.1 FLOORING

Given the existing wide range of options, agencies must ensure that the flooring materials selected for use are suitable for the type of activity that takes place in the office space. The following requirements should be met when selecting flooring.

- 8.1.1 Flooring materials should be selected based on their durability and ease of maintenance, to minimize wear and tear over time. Consideration should be given to the activities which will take place in the relevant spaces, for example, the use of tiles in wet areas.
- 8.1.2 When selecting tiles for government offices, tiles with reflective surfaces or glazed finishes shall not be used as these can pose a slip hazard.
- 8.1.3 Carpet shall be selected in keeping with the specifications provided in Appendix II. Carpet tiles are recommended over broadloom for flexibility and ease of treating with stains.

8.2 WALLS AND PARTITIONS

Floor space is subdivided using walls and partitions to create the necessary work and support spaces. Partition height depends on the level of privacy required in an office. Generally the type of work done by an employee is the deciding factor in the height of the partition for their workspace. Workstation partitions can start as low as 2.5ft or 762mm and go up to 7.5ft or 2286mm.

- 8.2.1 When located close to perimeter walls, particularly windows, workstation partition heights shall be limited to approximately 4 feet 5 inches or 1350mm.
- 8.2.2 Due to the significant direct and indirect costs involved, acoustically treated partitions should be limited to rooms where there is a functional necessity, e.g., rooms in which highly confidential interactions occur or where there is a need to provide acoustic isolation. If acoustic treatment is required, then this may be achieved with additional layers of plasterboard, acoustic infill or other specialist construction.




“Office fit-out materials must be appropriate for government office accommodation and take into account life cycle cost factors, including capital cost, operating and maintenance costs, cost of making changes, as well as ecological sustainability and community expectations.”





“Glass or other transparent partitions shall be considered for rooms that require light transmission, visual awareness or have a supervisory function.”



- 8.2.3** When partitioning enclosed spaces to provide acoustic privacy, there must be space around the door which would allow small amounts of sound to travel from and into the room. Complete sound blocking may pose a security hazard. Where complete acoustic isolation is required, other mechanisms should be implemented to ensure safety and security compliance.
- 8.2.4** Complex partition detailing shall be avoided unless functionally necessary. Complex partition detailing includes drop ceiling bulkheads, display recesses and special finishes.
- 8.2.5** Glass or other transparent partitions shall be considered for rooms that require light transmission, visual awareness or have a supervisory function. Examples include individual offices adjacent to the building core, reception areas and some conference rooms.
- 8.2.6** Laminated glass shall be used for installations within the office space. This allows the glass to hold together when shattered and in the event of breaking it prevents the glass from breaking up into large sharp pieces.
- 8.2.7** In spaces that are already equipped with partitions, new partitions shall be compatible with the existing system.
- 8.2.8** Modular partitioning with powered panels and cable management shall be used. (These partitions can be re-used and will reduce the cost in the long-run).
- 8.2.9** Enclosed spaces being utilized as offices, conference rooms, etc., should contain at least a 12” wide glass or other transparent panelling on either side of the door for safety and security purposes.
- 8.2.10** Partition and wall finishes must be durable, easy to maintain and meet health and safety standards.
- 8.2.11** All paints and wall finishes selected shall be low solvent, or solvent-free products, or products with low volatile organic compound (VOC) emissions, such as water based paints, varnishes and glues. 

8.3 FURNITURE

Furniture refers to any movable item used within the office space. This includes chairs, desks and cabinets etc. Careful consideration must be given to ensure the appropriate and cost-effective selection of furniture for use by government agencies.

- 8.3.1** Selected furniture shall be ergonomically suitable for the task and the person performing the task. Substantial degrees of adjustability will generally be required in order to suit the widest range of users, e.g., workers should be able to adjust the height of office chairs. The requirements of persons with special needs must be met and this might require furniture customization and/or acquisition of special equipment.
- 8.3.2** Furniture shall be chosen from a standard commercial range, of durable quality and standard dimensions.
- 8.3.3** Custom-designed furniture shall be provided only when functionally necessary or when better economy can be achieved. Custom furniture for Directors, Permanent Secretaries and Government Ministers can be sourced from the Furniture Branch of the Ministry of Works and Transport or from executive style models from a standard commercial range.
- 8.3.4** Ancillary furniture, such as coffee tables, chairs, sofas etc. used in meeting and conference rooms, shall be free standing to allow economical relocation and reuse.
- 8.3.5** Built-in furniture and joinery items shall only be used where they are functionally necessary or more cost-effective or there are no existing stand-alone furniture items readily available in the market place.
- 8.3.6** Built-in furniture that is fixed to floors, ceilings, core walls and external walls is to be kept to a minimum. Note: certain additions can become landlord fixtures.
- 8.3.7** Mobile furniture items shall be considered to allow simple office reconfiguration and personalized layout.
- 8.3.8** Existing furniture shall be reused where possible, except when it is at the end of its economic life, is functionally unsafe or obsolete or is uneconomical to refurbish or adapt to new purposes.
- 8.3.9** Materials and products should be selected based on economy, durability and sustainability criteria.
- 8.3.10** Workstation furniture which allows for cable management shall be utilized, with grommets to channel wires.

8.4 CEILINGS

Ceilings should be finished to safely conceal and provide termination points for mechanical, electrical and plumbing services.

- 8.4.1** The minimum finished ceiling height shall be 8.5ft or 2591mm.





“Selected furniture shall be ergonomically suitable for the task and the person performing the task.”





“Any good lighting design must meet functional, health and safety and ergonomic requirements while taking cost-effectiveness into account.”



- 8.4.2 White or any other light coloured ceilings should be used to allow for reflection of light, especially in spaces with low ceiling heights.
- 8.4.3 Bulkheads above the ceiling shall be avoided unless absolutely necessary, because of their high initial cost, the cost of removal when the tenancy is vacated and the high cost of modifying air conditioning services to suit.
- 8.4.4 Ceiling materials shall be selected for their acoustic and light transferring qualities. Hard surfaces increase the reflection of noise.
- 8.4.5 Asbestos free materials shall be used for ceiling applications. 
- 8.4.6 All paints and ceiling finishes selected shall be low solvent or solvent-free products, or products with low volatile organic compound (VOC) emissions, such as water based paints, varnishes and glues. 

8.5 LIGHTING

Lighting in buildings includes the use of both artificial and natural illumination. Artificial lighting represents a major component of energy consumption. Proper lighting can enhance task performance or aesthetics, while there can be energy wastage and adverse health effects of poorly designed lighting. Any good lighting design must meet functional, health and safety and ergonomic requirements while taking cost-effectiveness into account.

Buildings or office spaces identified for use by government may not have been outfitted with lighting, so a suitable design must be done.

- 8.5.1 Lighting shall be selected according to its function, e.g., task lighting to illuminate a work surface versus general lighting in open common areas.
- 8.5.2 Selected lighting fixtures shall be able to tolerate excess heat and be in keeping with safety codes.
- 8.5.3 Lighting shall be positioned so as to avoid the projection of shadows and glare.
- 8.5.4 Energy saving lamps shall be utilized as they use less energy and generate less heat. They should be selected in warm white or neutral white ranges. Warm white lighting allows for relaxation and can be used in lunch rooms etc., while the neutral light allows for better concentration and can be used above workstations. Poor lighting causes eyestrain, low productivity, a reduction in mental alertness and other health problems.

8.5.5 Lighting solutions which reduce energy consumption shall be utilized. These solutions include:

- Individual lighting controls,
- Motion sensors which turn off lights if there is no motion detected and,
- Or other systems which detect the degree of natural light present in the room and adjust the degree of artificial lighting to compensate. 💡

8.6 OTHER FINISHES

Finishes selected should meet health and safety requirements, be energy efficient as well as cost-effective.

8.6.1 Window treatments shall be incorporated in all office spaces exposed to glare or direct sunlight. This reduces the amount of external light which may penetrate the office space thereby:

- Lessening the heat intake of the building and reducing energy consumption; 💡
- Reducing the effect of harmful glare reflected off of monitors and other surfaces within the office space.

The choice of window treatments must have a uniform appearance both from the interior as well as the exterior views of the building.

8.6.2 Faucets and fixtures utilized must be of the water saving type, such as hands free faucets or self closing. 💡



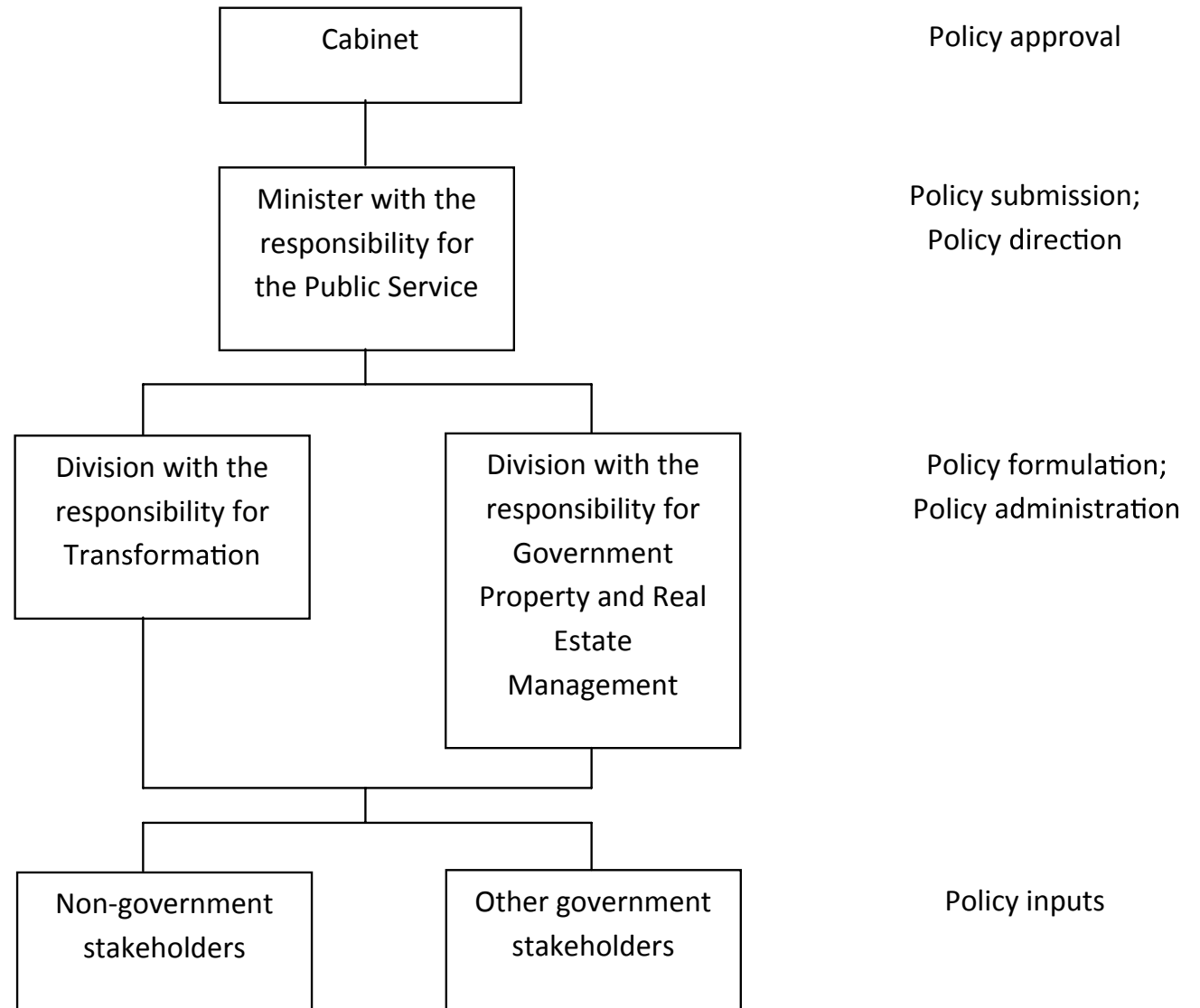
“Finishes selected should meet health and safety requirements, be energy efficient as well as cost-effective”



9.0 GOVERNANCE

9.1 GOVERNANCE STRUCTURE

The following diagram outlines the governance structure relating to this Policy:



9.2 ADMINISTRATION

The role of the Division of Government responsible for the Property and Real Estate Management function shall be twofold as follows:

- **Consultative** – Provide any government agency with the necessary guidance and advice during all phases.
- **Approving** – Provide the necessary approvals for outfitting of offices.

While the Ministry with the responsibility for transformation will have oversight role of the outfitting function. It will set-up and manage mechanisms to ensure compliance audits or impact evaluation is undertaken.

The following table outlines the specific responsibilities involved in outfitting of government offices:

No.	Activity	Agency Responsibility	Responsibility of the Property and Real Estate Management function
1	Space and other planning:	<ul style="list-style-type: none">• Preparation of User Brief and other planning documents.• Approval of other plans by Permanent Secretary.	<ul style="list-style-type: none">• Consultation during the planning process• Review of User Briefs.
2	Design	<ul style="list-style-type: none">• Development of professional designs/ plans and/or procurement of design services.• Approval from Agency's OSH committee.• Ensure compliance with lease terms and conditions.• Approval from landlord for design elements which impact the structure.• Obtain Cabinet approval for the funding for the outfitting for expenditure over the limit of the Accounting Officer.	<ul style="list-style-type: none">• Consultation during the design process• Review and approval of design/plans.





No.	Activity	Agency Responsibility	Responsibility of the Property and Real Estate Management function
3	Fit-out	<ul style="list-style-type: none">• Execution of fit-out and/ or procurement of fit-out services.• Approval from landlord for works which impact the structure or other tenants.	<ul style="list-style-type: none">• Consultation during the Fit-out process.• Monitoring of Fit-out.• Compliance/ breach reporting for Cabinet.• Reporting excellence in outfitting.
4	Compliance	<ul style="list-style-type: none">• Ensure ongoing compliance with the policy throughout the occupancy of the space.	<ul style="list-style-type: none">• Performance of annual audits supervised by a team comprising the Ministry of Public Administration, OSHA and other relevant stakeholders.• Compliance / breach reporting for Cabinet.



9.3 EFFECTIVE DATE

This policy is effective January, 12, 2012

9.4 FEEDBACK

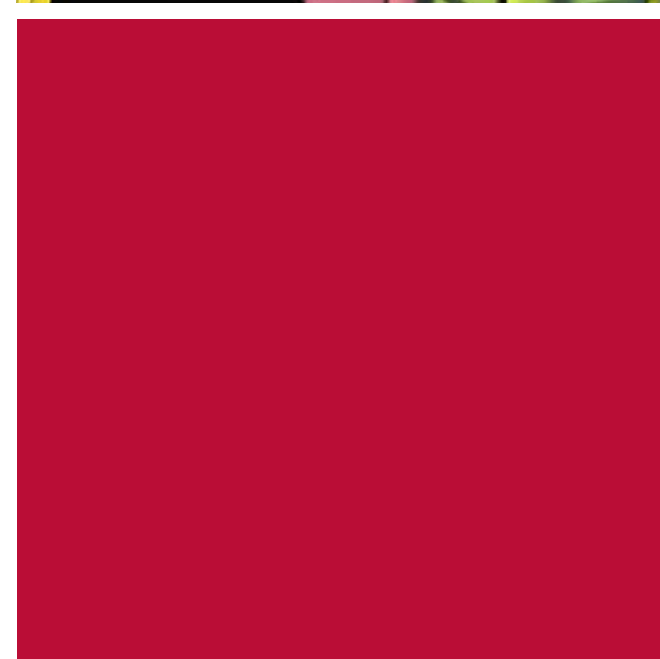
For additional information or to provide comments or feedback on this policy, please contact the Permanent Secretary of the Ministry responsible for the public service.

9.5 REVISION DATE

This policy will be revised at a minimum, every five (5) years, with the next revision due by January 12, 2017. The Standards as contained in the Appendices to the policy may be revised and published at shorter intervals. The revisions will be produced by the Ministry responsible for the public service in collaboration with the Ministry responsible for the Property and Real Estate Management function.

9.6 AMENDMENTS AND PUBLICATION

Any amendments to this policy will be published via the website of the Ministry with the responsibility for the public service and the Ministry with responsibility for Government Property and Real Estate Management.





10.0 REFERENCE DOCUMENTS

10.1 REFERENCE DOCUMENTS

- **Office Accommodation, Workspace and Fit out Standards, Office Accommodation Management Framework.** New Zealand Policy, Implementation Approval date: 19 November, 2004.
- **Working without walls: An Insight into the Transforming Government Workplace,** 2004, Tim Allen, Adryan Bell, Richard Graham, Bridget Hardy, Felicity Swaffer.
- **QUT Open Plan Office Design Policy Guidelines, Version 1.5,** Queensland University of Technology, September 2005.
- **Energy Efficiency – Developing the “EE” in the MEEA: Phase 1, Changing the Work Environment.** Energy Efficiency & Conservation Committee, Ministry of Energy & Energy Affairs, Republic of Trinidad and Tobago, 2011.
- **Green Office Policy:** The Ministry of Planning, Housing and the Environment, Republic of Trinidad and Tobago, 2010.

10.2 RELATED POLICIES, LAWS OR REGULATIONS

- **National Policy on Ageing for Trinidad and Tobago, 2006,** Ministry of Social Development
- **National Policy On Persons With Disability, 2010,** Ministry of the People and Social Development
- **The Occupational Safety and Health Act 1, 2004** as amended (2006), The Occupational Health and Safety Authority and Agency
- **NFPA Codes and Standards,** National Fire Protection Association, (International)



APPENDIX I

1.0 TERMS AND DEFINITIONS

The following table provides the definitions that apply to the terms used in this document:-

Term	Definition
Acoustic privacy	Acoustic Privacy is the ability to conduct confidential conversations and not be able to overhear the conversations of others. There are different degrees of acoustic privacy, ranging from none to complete.
Architectural Barriers	Any architectural feature of a home or public building that limits the access or mobility of disabled persons.
Base building/Building shell	This refers to the architecture of the existing building, including the framework, the perimeter / exterior walls, the building core and columns, and structural, load bearing elements of the building prior to interior fit out.
Broadloom	Carpet by the roll, as opposed to carpet tiles.
Bulkheads	A low structure on a ceiling, used as an architectural detail or to cover a shaft or protruding service equipment.
Carbon Footprint	The total amount of greenhouse gas emissions caused by any organization event, product or person.
Customer Service Areas	Areas used to provide service to an agency's clients or members of the public seeking assistance, where the nature of the service provided is transactional. The space is usually characterised by large seating / waiting areas and counters or small cubicles in which a Customer Service Representative deals with the client one-on-one.
Ergonomics	The interaction between people and their working environment, particularly the design of machinery and work stations, to suit the body and to permit work with minimum fatigue.

Term	Definition
Finishes	<ul style="list-style-type: none"> The texture or appearance of a surface.
Fit-out	The design and completion of shell space (i.e. raw floor space bounded by walls but not specifically adapted to the requirements of its occupants) with the specific interior partitioning, floor, ceiling, mechanical, electrical and environmental requirements of its occupants included.
Fittings	Items that are fixed in a building but which can be removed when the tenant moves, such as white boards, shelves and A/V equipment.
Fixture	<ul style="list-style-type: none"> Articles attached to a building, which normally remain in place after the tenant moves. An electrical device, such as a luminaire or an outlet, attached to a wall or ceiling.
Flexible working	A term used to describe a wide range of work styles which vary from the standard 8 hour day spent at a desk in the workplace.
Hot desks	A permanent work surface furnished with the relevant IT and communication services that is available to more transient employees who need to “plug in” for a couple of hours, on a few days a week, when they happen to be in the office. A Hot Desk is not a dedicated workspace for any one employee.
Illuminance	Illuminance refers to the amount of light falling on a surface. The most common, and often only, specification for lighting is the illuminance level, which is measured in either footcandles or lux. Lux is the international unit.
Office Accommodation	Any space, room or building in which business, clerical or professional activities are conducted and people work at desks/workstations.

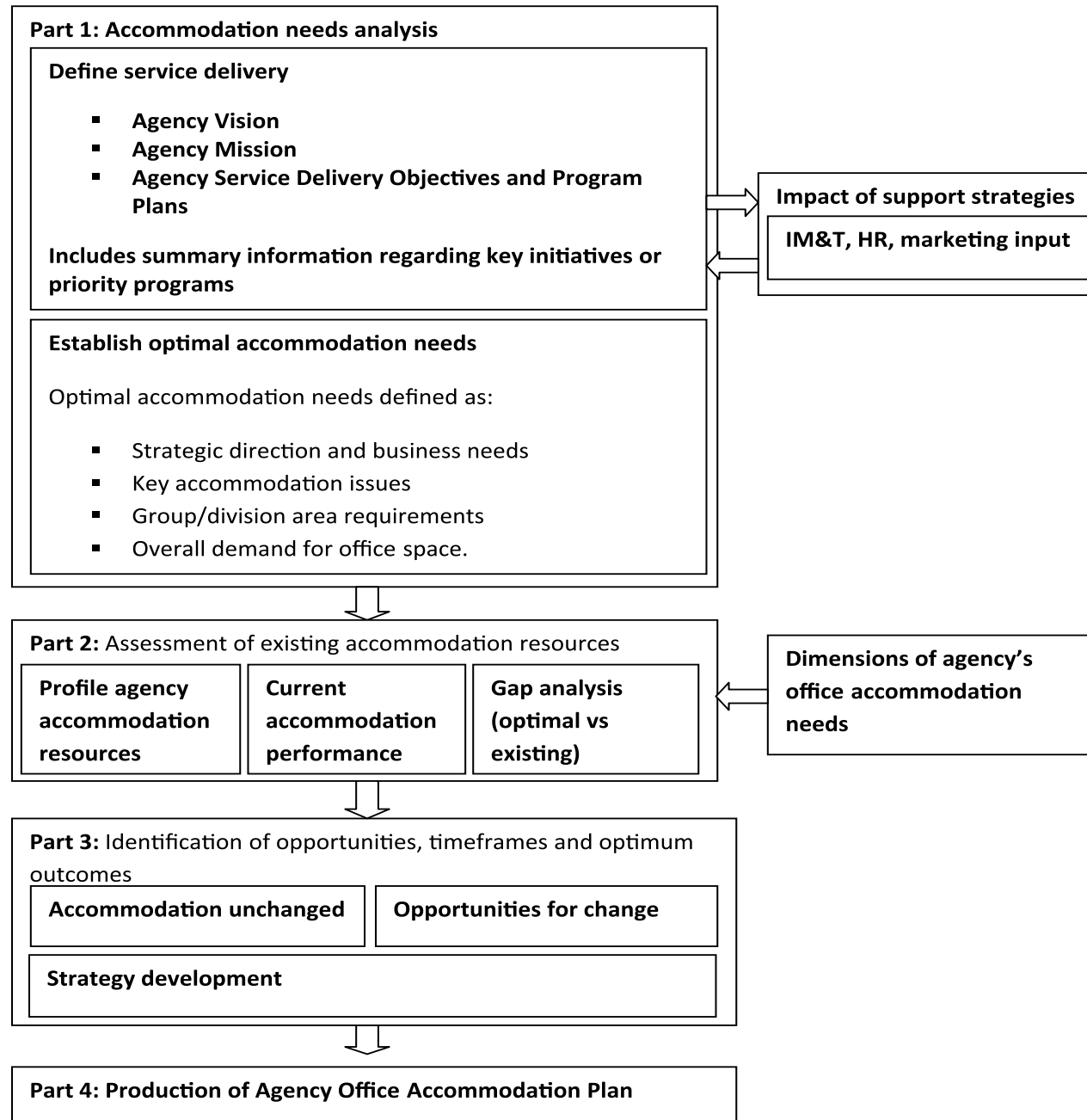
Term	Definition
Open plan	A building plan that has relatively few interior walls or partitions to subdivide areas for different uses. It is generally populated with workstations, i.e. systems furniture.
Partitions	A dividing wall within a building, usually non-load-bearing or the vertical element or upright used in systems furniture.
Raised Floors	These provide an elevated structural floor above a solid substrate (often a concrete slab) to create a hidden void for the passage of mechanical and electrical services and where necessary, services are brought up above floor level through termination points in the raised floor.
Reception Areas	The interface between a building's occupier and the public. This is usually the first place that a visitor to a building or office space encounters upon entering it and where the visitor identifies him / herself and the purpose of the visit, and is redirected appropriately, or at which correspondence and other deliveries are left. These spaces usually have a reception desk where information can be provided and a small seating area.
Sick buildings	Any building deemed unfit for occupation, by the relevant authorities, (OSH Authority) due to its unsanitary and/or unsafe conditions.
Space Planning	This refers to the analysis and design of spatial and occupancy requirements, including, but not limited to, space layouts and final planning.
Sustainability	Also referred to in the policy as 'Sustainable Design', means the use of resources in such a way that they are not depleted; a method of practice or use of materials that is capable of being continued with minimal long-term effect on the environment.

Term	Definition
Team zones	<p>These can be established as open areas partly separated from other work points by elements of the office, such as filing units. Ideally located outside of circulation zones, team zones should be furnished with casual seating and have communications outlets available.</p> <p>Team zones may be used for:</p> <ul style="list-style-type: none">▪ Relaxation▪ Informal meetings or team sessions▪ Alternate ad hoc work points
User Brief	<p>A guide that sets down the purpose of the space, the parameters for space requirements, occupation standards and technical innovation. It aims to permit the design of a building or office space to equip it for use in a manner which is sufficiently flexible to allow for change over time to meet the requirements of the agency occupying the space.</p>
Utility Bay	<p>An area within an office space in which an agency's copying, printing and faxing services is concentrated.</p>

Appendix II

1.0 USER BRIEF TEMPLATE

Agency office accommodation planning process



Part 1: Organizational details

Tenancy Requirements or description

- 1) Formal Name of the government division in the office.
- 2) Name and telephone number of the agency contact.
- 3) What is the role of the division or unit?
- 4) In the next 3-5 years what changes may affect accommodation, if any?
 - a) Agency strategic direction

Critical questions that can determine the agency's accommodation needs are:

- Can service delivery be made less asset and accommodation dependant?
 - What are the ways that accommodation can contribute to optimal service delivery outcomes?
 - When, where and how much accommodation is required?
 - Is there scope for the inter-agency or community benefits to be realized through sharing facilities or collocating accommodation?
- b) In what ways can office accommodation contribute or align with the corporate plans for IM&T, HR, Finance or Marketing?

Part 2: Quantity of space

Explanation	Tenancy requirement of description					
Staffing Indicate the current, and where possible, the forecast of staff numbers to be accommodated for the next three years.	In locations of more than 10 staff	Current no. of staff	Projected (1year)	Projected (3years)	Current area (ft²)	Required area (ft²) P&RES
	Permanent Establishment					
	Employee 1					
	Employee 2					
	Employee 3					
	Employee 4					
	Employee 5					
	Contract					
	Employee 1					
	Employee 2					
	Employee 3					
	Employee 4					
	Employee 5					
	TOTAL					
Public access and special use space required. These are needs, additional to normal office space and not specified in GoRTT Outfitting Policy Guidelines, e.g. large public enquiry/transactional counters, display/exhibition areas, non-noxious laboratories, therapy/consulting rooms, tribunal hearing rooms, basement storage and car parking	Special use spaces required				Current area (ft²)	Required area (ft²) P&RES
	Public areas (describe)					
	Public areas (describe)					
	Special uses (describe)					
	Storage (Basement)					
	Parking bays for SES/Pool official vehicles				Current no. of bays	Projected no. of bays
	Parking bays for field official vehicles					

Part 3: Quality of space

- 1) How would the accommodation be designed to more fully support the operations of the unit or organization?
- 2) Does your unit have any special security needs?
- 3) What works well in the current accommodation?
- 4) What are the worst aspects of the current accommodation?

Part 4: Whole-of-Government opportunities

- 1) Please provide details if your unit or agency has any facilities that may be under-utilized and potentially suitable for adapting to Government office accommodation?
- 2) Are there any opportunities for either sharing office accommodation facilities or colocating with other agencies to improve/agency/government delivery of services?
- 3) Which other agencies would your organization prefer to be located nearby?
- 4) Other comments not covered above?

2.0 OFFICE SIZE STANDARDS

Position / Function	Type of Office	Required Area (m ² ,ft ²)	Recommended Partition/Wall Height
Minister and Parliamentary Ministers (includes bathroom with shower and kitchen area equipped with sink)	Enclosed office	Minimum 56 m ² (7x8)m 600 ft ² (22'9"x26'2") Maximum 64 m ² (8x8)m 686ft ² -(26'2"x26'2") Conference room (12 persons)260ft ² /24m ² (4x6)m/13'x20'	Ceiling height walls
Permanent Secretary, Director of Personnel Administration, Chief Personnel Officer. (includes bathroom with shower and kitchen area equipped with sink)	Enclosed office	Minimum 35 m ² (5x7)m 376 ft ² (16'4"x22'9") Maximum 40m ² (5x8)m 430 ft ² (16'4"x26'2")	Ceiling height walls
Deputy Permanent Secretary	Enclosed office	Minimum 28 m ² (4x7)m 230 ft ² (13'1"x22'9") Maximum 35 m ² (5x7)m 376 ft ² (16'4" x22'9")	Ceiling height walls
Directors/ Heads of Divisions	Enclosed office	Minimum 20 m ² (4x5)m 215 ft ² (13'1"x16'4") Maximum 24 m ² (4x6)m 257 ft ² (13'1"x19'6")	Ceiling height walls
Deputy Director/ Executive Director	Enclosed office	Standard 16m ² (4x4)m 172 ft ² (13'1"x13'1")	Ceiling height walls
Department Manager/Advisors to Ministers, Lawyers	Open workstation	Standard 12 m ² (3x4)m 128 ft ² (9'8"x13'1") 65 ft ² (6'6"x9'8")	78" / 2m

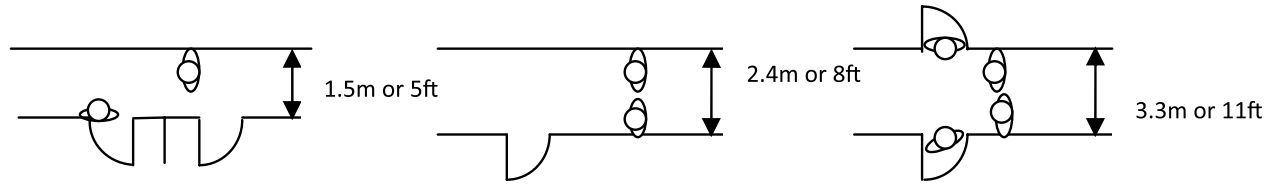
Position / Function	Type of Office	Required Area (m ² ,ft ²)	Recommended Partition/Wall Height
Professional Staff/ Supervisors, which includes drafting Technicians	Open workstation	Standard 9m ² (3x3)m 96 ft ² (9'8"x9'8")	66" / 1.70m
Minister's personal secretary/Minister's personal assistant/Executive Secretary	Open workstation	Standard 5m ² (2.5x2)m 54 ft ² (8'2"x6'6")	54"-66" / 1.40m – 1.70m
Junior staff/ Clerical/ Secretarial	Open workstation	Standard 4m ² (2x2)m 44 ft ² (6'6"x6'6")	42" / 1m
Driver/Messenger	Open workstation	Standard 2.25 m ² (1.5x1.5)m 24 ft ² (4'9"x4'9")	42" / 1m
Security Officer	Open workstation	Standard 2.25 m ² (1.5x1.5)m 24 ft ² (4'9"x4'9")	42" / 1m
Conference Room (6 persons)	Screened area/Glazed or treated	Standard 12 m ² (3x4)m 128 ft ² (9'8"x13'1")	
Conference Room (12 persons)	Screened area/ Glazed or treated	Standard 24 m ² (4x6)m 257 ft ² (13'1"x19'6")	
Conference Room (18 persons)	Multi-use Area Screened area/Glazed or treated	Standard 36 m ² (4x9)m 386 ft ² (13'1"x29'5")	
Kitchen		128ft ² / 12m ²	
Lunch room		12-19ft ² /1m ² - 1.8m ² (per person)	
Sick Bay		Minimum 12 m ² (3x4)m 128 ft ² (9'8"x13'1")	

3.0 WASHROOM SANITARY FIXTURE PROVISIONING STANDARD

No. Of men	No. Of Water Closets	No. Of Urinals	No. of women	No. of water closets	No. of women or men	Wash basins
1 – 9	2	1	1 – 15	3	1 – 20	3
10 – 15	4	2	16 – 35	6	21 – 40	6
16 – 40	6	3	36 – 55	9	41 – 60	9
41 – 55	8	4	56 – 80	12	61 – 80	12
56 – 80	10	5	81 – 110	15	81 – 100	15
81 – 100	12	5	110 – 150	18	101 – 125	18
101 – 150	14	7	151 – 190	21	126 – 150	21
151 – 160	16	8	111 – 240	24	151 – 175	24
161 – 190	18	9	241 – 270	27	176 – 200	27
191 - 220	20	10	271 - 300	30	201- 225	30

4.0 CIRCULATION SPACE REQUIREMENTS

Example 1: Doors open towards the inside of rooms

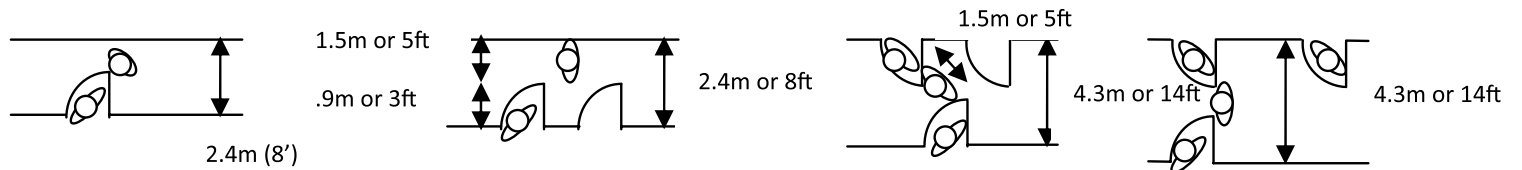


With doors on one side and little use.

With doors on one side and frequent use.

With doors on both sides and frequent use the min.

Example 2: Doors open towards the outside into corridor



With doors on one side and little use.

With doors on one side and frequent use.

With doors on both sides and frequent use

With doors on both sides directly facing each other

5.0 RECOMMENDED CARPET SPECIFICATIONS

- **Construction**

Tufted loop, cut carpets or combinations of the two should be used. Loop piles of low, dense construction tend to retain their appearance and resiliency. Cut pile or cut loop are very good choices for administrative areas, individual offices and conference rooms.

- **Face Fibre**

One hundred percent (100%) nylon is recommended. It is the most prevalent fibre used in commercial carpets. It is excellent in wearability, abrasion resistance and resiliency. It is also easily cleaned and can be stain resistant. Nylon fibres withstand the weight and movement of furniture and are generally good for all traffic areas. Alternatively polyester is naturally stain and fade resistant and offers exceptional softness and colour clarity and if a polyester carpet is denser than the nylon it will outwear a less dense nylon.

- **Stain Repel/ Stain Resist/ Soil Release-** Carpeting must have all of the above characteristics.
- **Antimicrobial-**All carpeting should be treated with an antimicrobial finish with built in protection. This process inhibits the growth of microbes or potentially harmful bacteria.
- **Dye Method-** Injection (For longer lasting colour)
- **Finished Face Weight-** 20 oz. /sq. yd. (678.1 g. /m²) the higher the ounces per square yard the better the carpet.
- **Gauge-** 1/8 (31.5/10 cm.)
- **Rows-** 8.0/in. (31.3/10cm)
- **Tufts-** 64.0/sq.in. (992.3/100 sq.cm.)
- **Finished Pile Height-** 0.09 in. (992.3/100 sq.cm.)Pile height does not add to carpet wear or crush less unless the pile has high density. It will add to the softness of the carpet. A carpet with a high pile height and low density will crush and mat more than a shorter but denser carpet.
- **Density Factor-** Density indicates how tightly the fibres are stitched together into the carpet backing. A high density factor will give you the assurance of many years of lasting comfort and beauty. The recommended density factor is 483,507.
- **Average Density-** 8,000

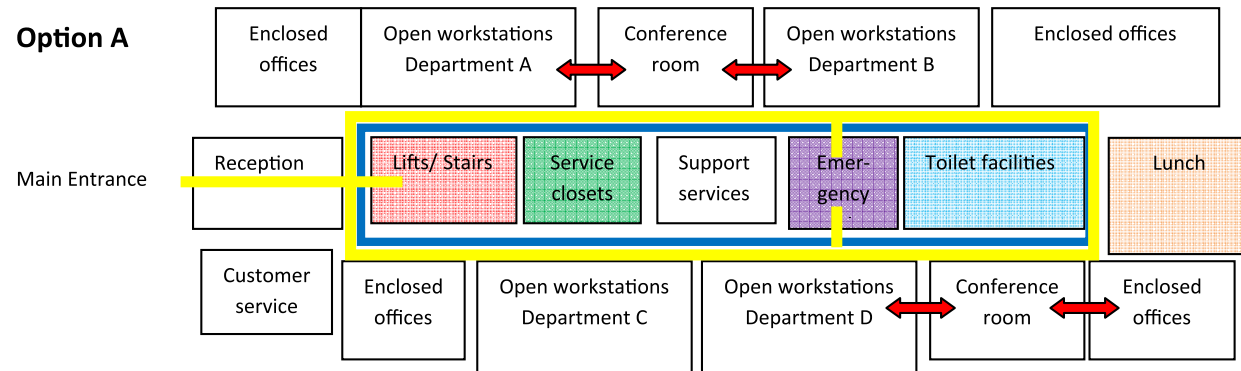
- **Standard Backing-** PVC- Free cushion with pre-applied adhesive
- **Recycled Content by Total Product Weight-** 25% Pre-Consumer, 3% Post-Consumer
- **Nominal Total Thickness-** 0.35 in. (8.9mm)
- **Tile Size-** 1m x 1m (39.4 x 39.4 in)
- **Nominal Total Weight-** 104.8 oz./yd². (3,553.5 g./m²)
- **Flammability (Radiant Panel ASTM-E-648)-** ≥ 0.45 (Class I)
- **Smoke Density (NFPA-258-T or ASTM-E-662)-** ≤ 450
- **Methenamine Pill Test (CPSC FF-1-70 or ASTM D 2859)-** Self-Extinguishing
- **Light fastness (AATCC 16E) -** ≥ 4.0 at 80 hrs.
- **Crocking (AATCC 165)-** ≥ 4.0 wet or dry
- **Static Electricity (AATCC-134) 20% R.H., 70°F -** ≤ 3.5 KV, Permanent Conductive Fiber
- **Dimensional Stability- Aachen Test (DIN Std 54318)-** $\leq 0.2\%$

6.0 LIGHTING LEVEL REQUIREMENTS

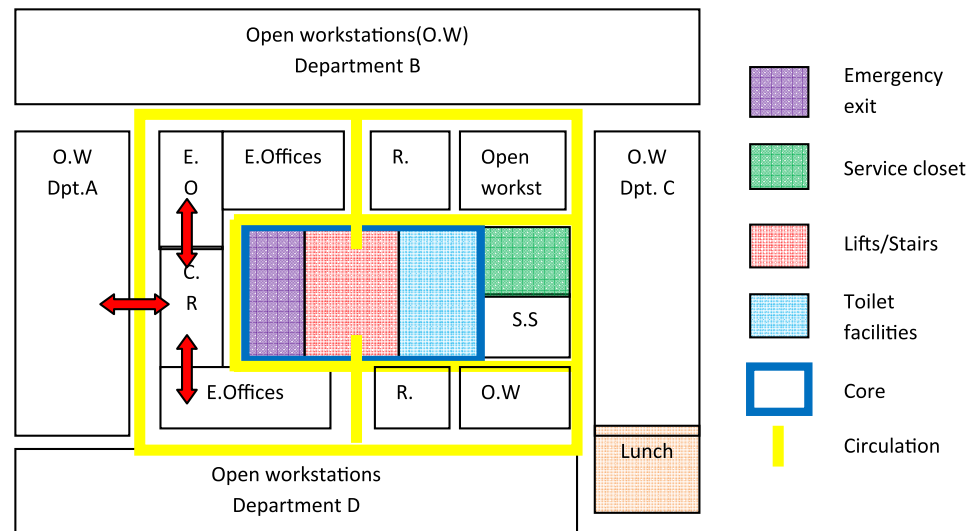
Space	Requirements in Lux
Offices with workstations near windows	300
offices	500
Open-plan offices	
-high reflection	750
-moderate reflection	1000
Technical drawing	750
Conference rooms	300
Reception rooms	100
Rooms for public use	200
Data processing	500
Circulation zones/ staircases	50/100

7.0 OFFICE SPACE CONFIGURATION GUIDE

Option A



Option B



S.S- Support services

C.R- Conference room


R- Reception

E.O- Enclosed offices

Appendix III

1.0 LIST OF GOVERNMENT MINISTRIES AS AT JUNE 2012

Ministry of Communications
Ministry of Community Development
Ministry of Education
Ministry of Energy & Energy Affairs
Ministry of Finance & the Economy
Ministry of Food Production
Ministry of Foreign Affairs
Ministry of Gender, Youth and Child Development
Ministry of Health
Ministry of Housing, Land & Marine Affairs
Ministry of Justice
Ministry of Labour, Small & Micro Enterprise Development
Ministry of Legal Affairs
Ministry of Local Government
Ministry of National Diversity & Social Integration
Ministry of National Security
Ministry of Planning and Sustainable Development
Ministry of Public Administration
Ministry of Public Utilities
Ministry of Science & Technology
Ministry of Sport
Ministry of Tertiary Education & Skills Training
Ministry of the Arts & Multiculturalism
Ministry of the Attorney General
Ministry of the Environment & Water Resources
Ministry of the People and Social Development
Ministry of Tobago Development
Ministry of Tourism
Ministry of Trade, Industry & Investment
Ministry of Transport
Ministry of Works and Infrastructure
Office of the Prime Minister

The background features a light gray grid pattern that recedes into the distance, creating a sense of depth. A prominent diagonal band of solid red color runs from the bottom left towards the top right, intersecting the grid. The text is positioned in the lower-middle section of the image, overlaid on the grid.

This policy is published in collaboration with the
Ministry of Housing, Land & Marine Affairs and the Ministry of Public Administration

STRUCTURAL VISUAL CONDITION SURVEY REPORT

November 10, 2023

Project: **OFFICE BUILDING RENOVATION & OUTFITTING**

Location: **76-78 ST. VINCENT STREET, POS, TRINIDAD**

Client: **GAMBLING (GAMING AND BETTING) CONTROL COMMISSION OF TRINIDAD AND TOBAGO**

A) DESCRIPTION

This report is an initial structural assessment based on the site inspection conducted by UDeCOTT on September 1, 2023 around 3:30pm with personnel from Gambling (Gaming and Betting) Control Commission to develop the scope of work of the RFP for Design-Build. The building is currently unoccupied and the year it was built is unknown.

The limitations of this report based on the lack of information for review must be noted:

- No as-built Structural Drawings, specifications, material data sheets and calculations were available for review at the time of the site inspection;
- No as-built information with respect to structural approvals such as Ministry of Works, Port-of-Spain city cooperation were available for review at the time of the site inspection;

Bidders are required to visit the site and do its independent assessment to familiarize themselves and understand the full nature and extent of work and its constraints to consider in their tender.

The building is considered a six story structure with roof deck for MEP services & motor room equipment and the ground floor is parking with rooms for circulations and electrical rooms. The site and building layout w/ dimensions are shown in the attached floor plans (**See Appendix 1**).

The height of the building from ground floor to 6th floor roof deck level is ~60ft based on assumed 12ft height per floor.

STRUCTURAL VISUAL CONDITION SURVEY REPORT



B) STRUCTURAL SYSTEM & ACTUAL MEMBER SIZES

The structure can be classified as an Intermediate Steel Moment Frame system on both X & Y direction from basement to roof deck level.

The steel columns are approximately W10x39 and W12x79 wide flange from ground floor to roof deck.

The ground floor slab have a concrete slab diaphragm and the upper floors have Wide flange main beams and 4 filler beams every bay supporting corrugated roof sheet that assumed used as permanent formworks only for structural concrete slab that act as rigid floor diaphragm.

Below are the major member sizes observed but not limited to:

NO.	ELEMENT	ACTUAL SIZES
1	Ground Floor Slab	Unknown thickness and reinforcement. Have some sign of cracks probably due to lack of control joints and/or reinforcement.
2	Steel Columns	~W12x79 internal columns ~W10x30 external columns
3	Main Beams	W 18 beams moment connection at column flange to flange
4	Filler Beams	W12 beams w/ lateral brace (4pcs per bay)
5	Slab	Unknown thickness and reinforcement but looks okay and no sign of structural cracks. Used corrugated roofing sheet as permanent formworks.
6	Footings & Grade Beams	Unknown. No sign of settlement and structural cracks observed.

STRUCTURAL VISUAL CONDITION SURVEY REPORT



D) OBSERVATIONS AND RECOMMENDATIONS

NO.	OBSERVATION	RECOMMENDATION (See Appendix 2 Photos)
A	CIVIL STRUCTURAL	
1	No structural as-built drawings are available. The steel columns used appeared small for the height if it need to be complied with MOWT design branch seismic design requirements. But for a normal design for Regional Corporation approval the building appeared to be structurally acceptable.	Client to find and submit a copy of any as-built drawings/relevant constructio documents available if any for contractor's reference.
2	~1.5" Corrugated roof sheet was used instead of 3" metal deck.	The ~1.5" corrugated sheets appeared used as permanent formworks only for minimum 4" thk concrete slab with normal reinforcement instead of 3" composite metal deck slab as normally use in combination for steel structures. No as-built drawing to verify the slab thickness and reinforcement but no structural crack & deflection observed to date so assumed it is acceptable.
3	Some cracks observed in the ground floor slab parking. That would be due to lack of saw cut control joints and/or inadequate soil compaction or insufficient slab thickness or reinforcement.	Repair all cracks observed by pressure injection of epoxy based non-shrink grout and/or other suitable products/method to avoid further damage and ingress of moisture. Better to put saw cut joints every column gridlines on both directions to control the propagation of cracks.
3	Corrugated roof sheet deck form at HVAC room penetrations adjacent to wall	Clean/remove rusts of corrugated roof sheet deck and steel beams and put angle framing in the MEP penetration openings to support the unsupported portion of slab. Provide firestop materials also similar to the existing on all openings required to seal for fire.
4	Straight Stair steps & slope at Level 5 Roof Deck to check if acceptable to Building Maintenance Crew.	Straight Stair can be upgrade to normal U-shape stair w/ landing for better access for maintenance if deemed required. But it need to be planned based on the future use of this area if it plan to be used for furture extension for office space that can be covered by metal roof.

STRUCTURAL VISUAL CONDITION SURVEY REPORT



NO.	OBSERVATION	RECOMMENDATION (See Appendix 2 Photos)
5	Main Stair with big gap adjacent to wall	This would be an HSE issue. Better to close the gap for safety and aesthetic.

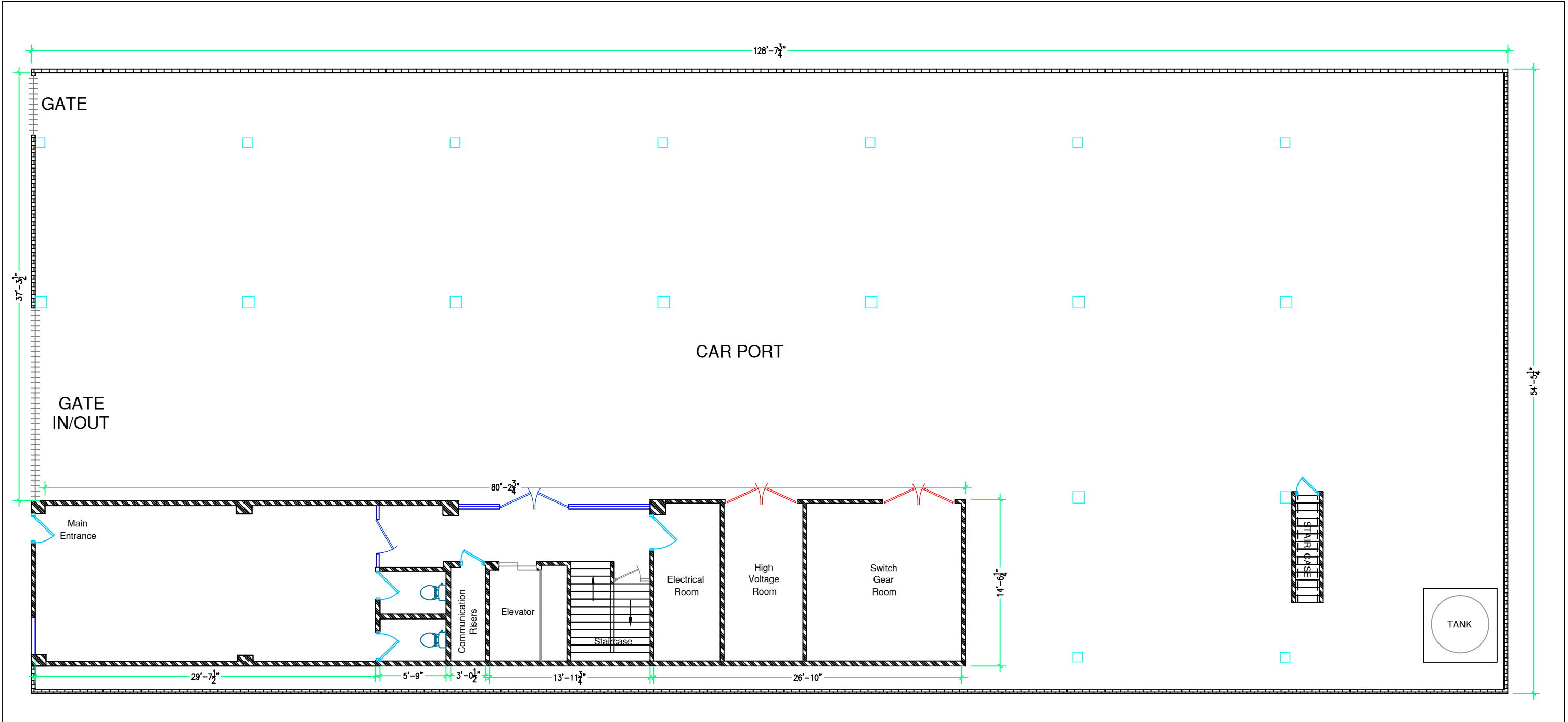
E) CONCLUSION / REMARKS

Based on visual inspection, the existing building appears to be structurally sound at the time of inspection and can be renovated and use for specific to the requirements of the Gambling (Gaming and Betting) Control Commission occupancy and modern operations.

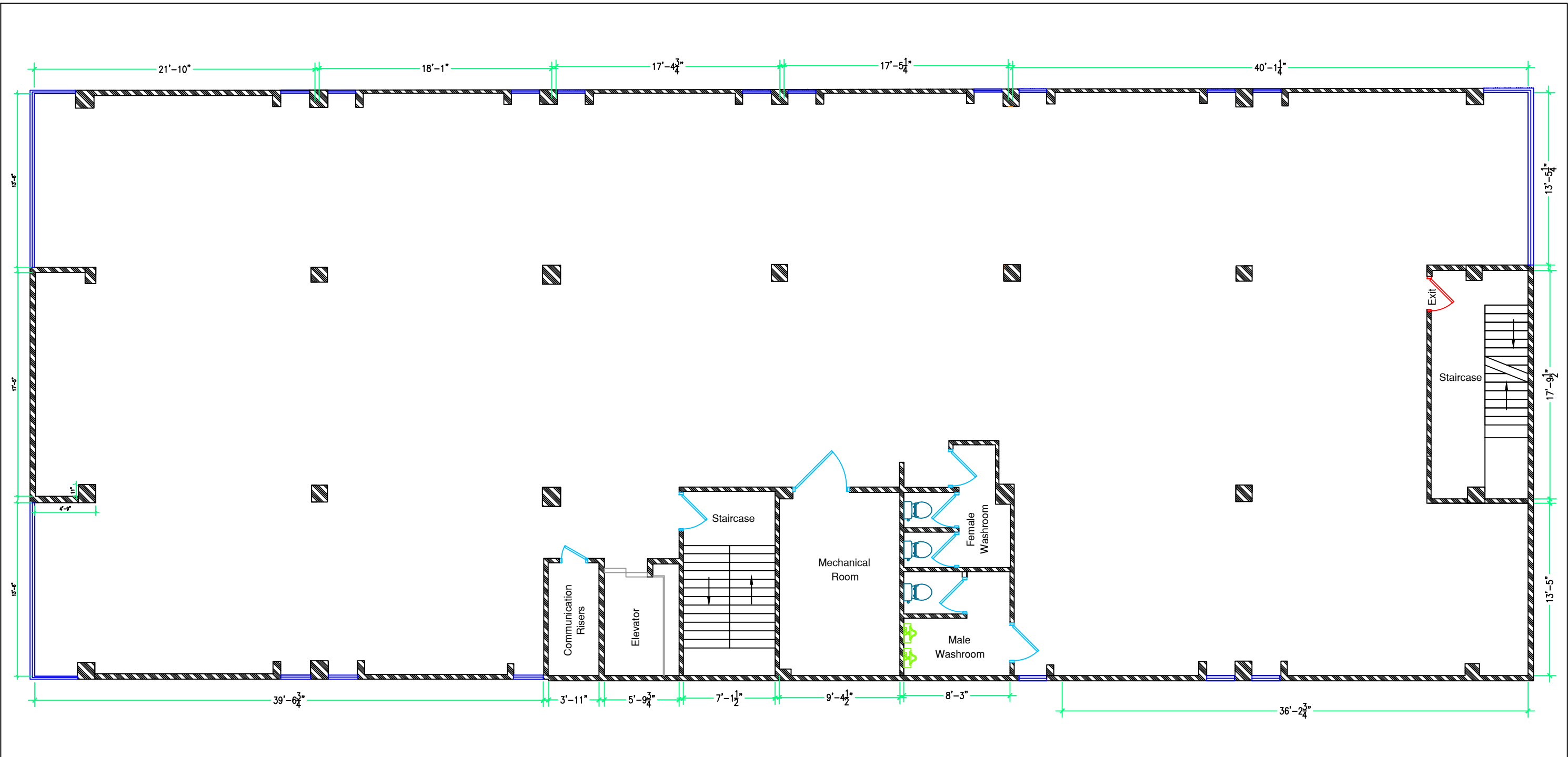
The observations and recommendations indicated in **Section C** above should be carried out at a minimum in conjunction with the Architectural & MEP recommended works identified in such other documents to comply with OSHA, Local Statutory Authorities and other relevant current codes and standards.

Successful Contractor to assess the structural integrity of the building, and report to the Client any potential issues as it relate to the structural integrity of the building

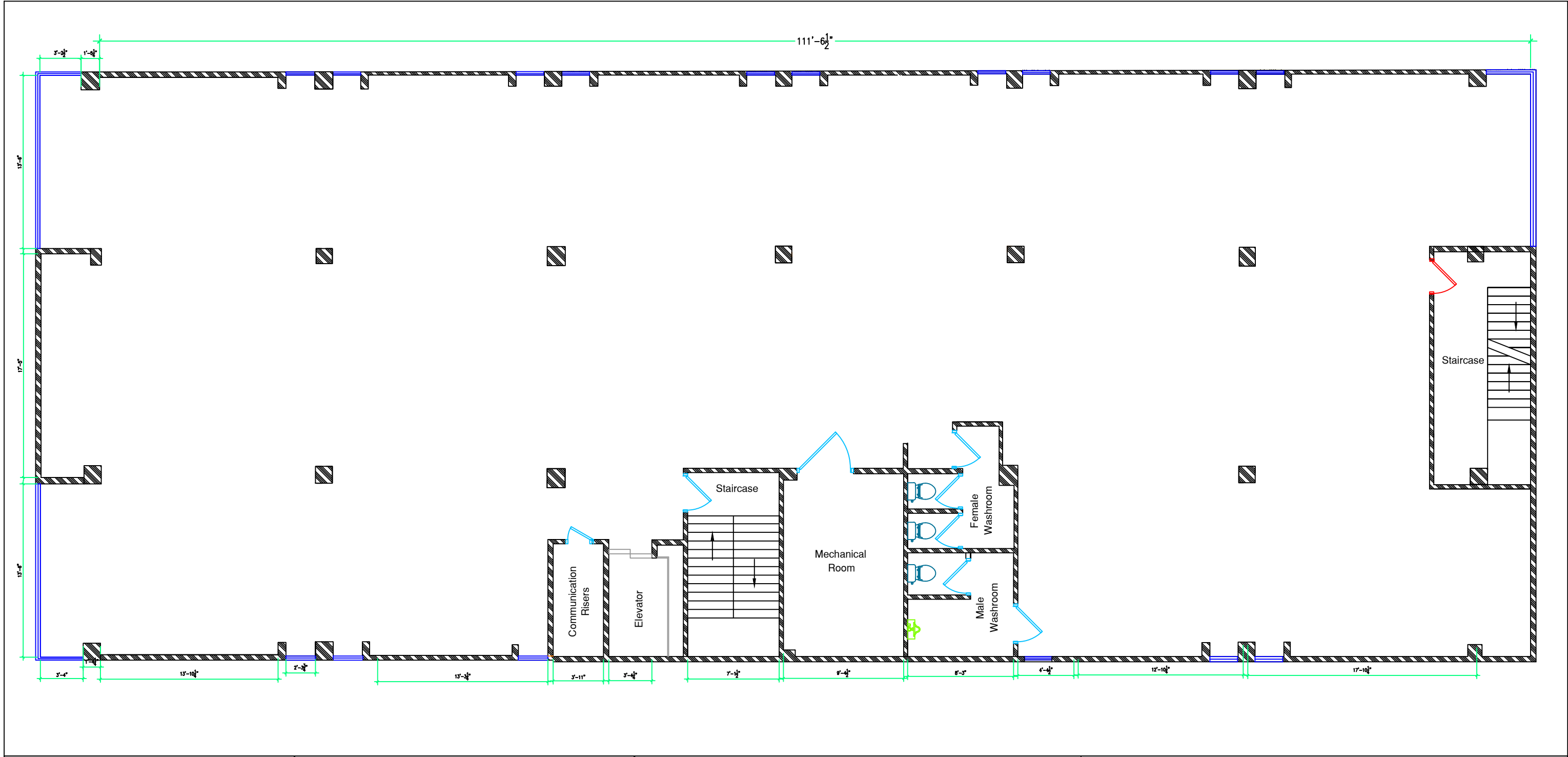
F) APPENDIX I (Architectural Floor Plans) & APPENDIX II (Photos)



J.M FERRY & COMPANY LTD. #24 Crawford Street, Vistabella, San Fernando, Trinidad Email : kerrl.seenath@jmferryll.com " Your Total Office Solution Company "		TEL: (868) 657 - 0118 FAX: (868) 653 - 2521
Project: OFFICE BUILDING - 76-78 ST VINCENT STREET-P.O.S	Date: 20/01/2020	
Dwg. Title: EXISTING BUILDING PLAN	DWG #: GROUND FLOOR	
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NOTES: Existing Concrete Walls Existing Glass Existing Perimeter Concrete Walls		REVISED ON: All measurements are to be confirmed on site



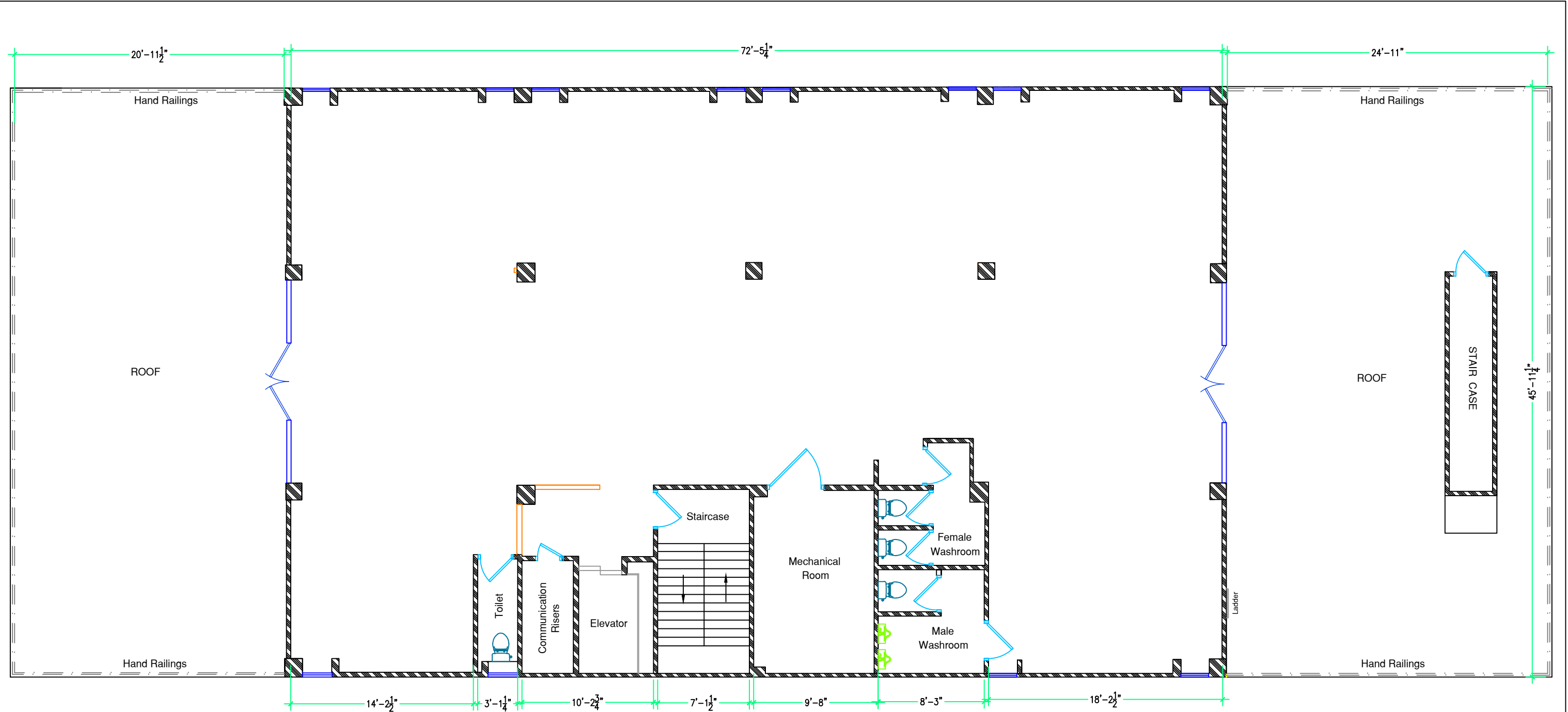
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Project:	OFFICE BUILDING - 76-78 ST VINCENT STREET-P.O.S	Date:	29/01/2020
Dwg. Title:	EXISTING BUILDING PLAN	DWG #:	LEVEL 2
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NOTES: Existing Concrete Walls Existing Gypsum Wall Existing Glass		REVISED ON All measurements are to be confirmed on site	



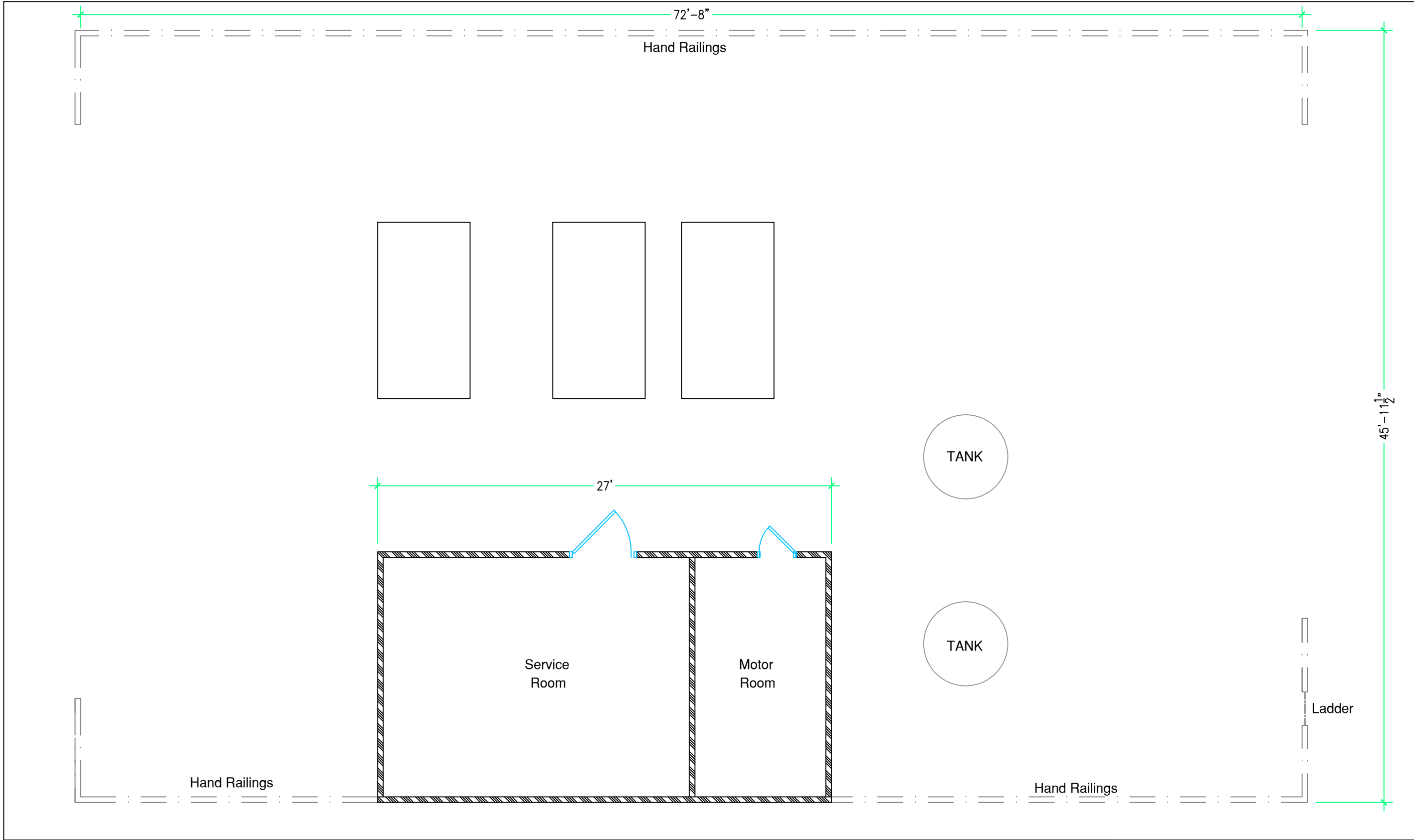
J.M FERRY & COMPANY LTD. #24 Crawford Street, Vistabella, San Fernando, Trinidad Email : kerri.seenath@jmferrytt.com " Your Total Office Solution Company"		TEL: (868) 657 - 0118 FAX: (868) 653 - 2521
Project: OFFICE BUILDING - 76-78 ST VINCENT STREET-P.O.S	Date: 29/01/2020	
Dwg. Title: EXISTING BUILDING PLAN	DWG P: LEVEL 3	
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NOTES: Existing Concrete Walls Existing Gypsum Wall Existing Glass	REVISED ON
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All measurements are to be confirmed on site



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Project: OFFICE BUILDING - 76-78 ST VINCENT STREET-P.O.S		Date: 29/01/2020			
Dwg. Title: EXISTING BUILDING PLAN		DWG #: LEVEL 4			
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<p>#24 Crawford Street, Vistabella, San Fernando, Trinidad</p> <p>Email : kerri.seenath@jmferryt.com</p> <p style="text-align: center;">" Your Total Office Solution Company "</p>		<p>TEL: (868) 657 - 0118</p> <p>FAX: (868) 653 - 2521</p>
Project:	OFFICE BUILDING - 76-78 ST VINCENT STREET-P.O.S	Date: 29/01/2020
Dwg. Title:	EXISTING BUILDING PLAN	DWG #: LEVEL 5
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TEL: (868) 657 - 0118
FAX: (868) 653 - 2521

Date: 29/01/2020

LEVEL 5

SCALE:
AS SHOWN

NOTES:

 Existing Concrete Walls

REVISED ON
<p><i>All measurements are to be confirmed on site</i></p>

All measurements are to be confirmed on site













MECHANICAL, ELECTRICAL & PLUMBING (MEP) **VISUAL CONDITION SURVEY REPORT**

September 12th, 2023

Project: **OFFICE BUILDING RENOVATION & OUTFITTING**

Location: **76-78 ST VINCENT STREET, PORT-OF-SPAIN, TRINIDAD**

Client: **GAMBLING (GAMING AND BETTING) CONTROL COMMISSION OF
TRINIDAD AND TOBAGO**

A) DESCRIPTION

This report is an initial Mechanical, Electrical & Plumbing (MEP) high level assessment based on the site inspections conducted by UDeCOTT on September 1st, 2023 and September 12th, 2023 around 2:45 pm respectively with personnel from Gambling (Gaming and Betting) Control Commission to develop the scope of work of the RFP for Design-Build.

The limitations of this report based on the lack of information for review must be noted are:

- No As-built MEP Drawings, Specifications, Equipment Cut Sheets and Design Calculations were available for review at the time of the site inspection;
- No As-built information with respect to the relevant MEP approvals such as Electrical Inspectorate, Fire Final Approval, Fire Life Safety Certificate, Water and Sewerage Authority (WASA), etc were available for review at the time of the site inspection;
- No data values such as temperature, air flow, humidity, lighting lux, voltages, current, water flow, pressure etc could not have been taken for verification purposes;
- All enclosed/hidden MEP services could not be fully assessed as there wasn't any dismantling of equipment, plant or systems to investigate thoroughly.

The building is considered a six story structure with a roof deck for MEP services and an old motor room for equipment. The ground floor has parking with rooms for circulation and MEP rooms (electrical and plumbing chase). The site and building layout with dimensions are shown in the attached architectural general floor plans (**See Appendix II**). The height of the building from ground floor to 6th floor roof deck level is ~60ft based on assumed 12 ft height per floor.

MECHANICAL, ELECTRICAL & PLUMBING (MEP)

VISUAL CONDITION SURVEY REPORT



B) MECHANICAL, ELECTRICAL & PLUMBING (MEP) SYSTEMS

The Mechanical, Electrical and Plumbing (MEP) systems that are currently installed at the 76 -78 St. Vincent, Port-of-Spain office location are:

1) MECHANICAL

- (1) One Tempblue (2) Ton Spilt unit that provides cooling for the entrance security and waiting area on the ground floor with no provision for the fresh air into this space;
- (1) One Carrier 40RUAA30A4A5-0A0A0 (30) Ton DX Air Handler Unit (AHU) which utilizes R-410A refrigerant that provides cooling to first floor. The floor standing AHU has (8) filters to be installed/replaced with a drain pan installed that is piped to the southern wall due to the AHU room directly located over the transformer and main electrical rooms on the ground floor. No fresh air provision was seen for this floor;
- (1) One Carrier 40RM-028--B511GC (25) Ton DX Air Handler Unit (AHU) which utilizes R-22 refrigerant that provides cooling to 2nd floor. The floor standing AHU has (8) filters to be installed/replaced with a drain pan installed that is piped to the floor drain that is located in the center of the room. No fresh air provision was seen for this floor;
- (1) One Carrier 40RUAA30A4A5-0A0A0 (30) Ton DX Air Handler Unit (AHU) which utilizes R-410A refrigerant that provides cooling to 3rd floor. The floor standing AHU has (8) filters to be installed/replaced with a drain pan installed that is piped to the floor drain that is located in the center of the room. No fresh air provision was seen for this floor;
- (1) One Carrier 40RUAA25A4A6A0A0A0 (25) Ton DX Air Handler Unit (AHU) which utilizes R-410A refrigerant that provides cooling to 4th floor. The floor standing AHU has (8) filters to be installed/replaced with a drain pan installed that is piped to the floor drain that is located in the center of the room. This unit however has a voltage tag of 460V/3PH/60Hz where the building voltage supply is 230V/3PH/60Hz. No fresh air provision was seen for this floor;
- The following Air Conditioning (AC) Condenser units are located on the roof that are connected to the AHU's listed above:
 - a) One Carrier 38AUZA16A0A5A0A0A0 Serial # 3220P33977 - (15) Ton DX, R-410A Condenser operating voltage 208/ 230V/3PH/60Hz.
 - b) One Carrier 38AUZA16A0A5A0A0A0 Serial # 4919P32199 - (15) Ton DX, R-410A Condenser operating voltage 208/ 230V/3PH/60Hz.

MECHANICAL, ELECTRICAL & PLUMBING (MEP)

VISUAL CONDITION SURVEY REPORT



- c) One Carrier 38AUZA16A0A5A0A0A0 Serial # 3421P33510 - (15) Ton DX, R-410A Condenser operating voltage 208/ 230V/3PH/60Hz.
- d) One Carrier 38AUZA16A0A5A0A0A0 Serial # 3421P33509 - (15) Ton DX, R-410A Condenser operating voltage 208/ 230V/3PH/60Hz.
- e) One Carrier 38AKS028---511-- Serial # 0604F15695 - (25) Ton DX, R-22 Condenser operating voltage 208/ 230V/3PH/60Hz.
- The Air Conditioning Air Distribution system is comprised of an insulated supply air metal ductwork system with main runs and branches. The supply air metal ceiling diffusers (Air Guide JS Series) are distributed throughout the open floor plan on each level with the applicable connection to main/branch ducts via flexible duct. No visible main and branch ducts' volume control dampers were seen and the return air system utilizes the hallways and corridors where entrance into the Air Handler Rooms are through ~ 48" (W) x 36" (H) metal door grilles. No cooling via ceiling supply grilles to the bathrooms are installed with these areas capturing heat that radiates into the space through the southern walls. No provision for fresh air as required per ASHRAE for occupancy comfort and well being was seen installed within the building. The type and status of the filters installed for all the AHU are unknown as no data was readily available;
- Wall Mounted louvers connected to inline exhaust fan (powered off) ducted to a main exhaust metal duct two ducted wall exhaust grilles located within the toilets on ground floor have been installed but the CFM ratings for both spaces could not be determined at the time of the inspection;
- Ceiling exhaust grilles connected to flex ducts are installed in the main bathrooms on each floor but the final termination of these flex ducts could not be found. It was observed that close to the end of the flex duct, a hole exists where the exhaust air dumps into the ceiling plenum close to the elevator shaft location;
- No exhaust fan or exhaust duct work installations for the janitor rooms were observed;
- (1) One Kone 13 person (1000 KG) elevator is installed with the associated fireman's lift switch and emergency phone installed with the current inspection certificate valid till May 9th, 2024.

MECHANICAL, ELECTRICAL & PLUMBING (MEP)

VISUAL CONDITION SURVEY REPORT



2) ELECTRICAL

- The main incoming electrical service from T&TEC is via a 12KV line to the HV rooms located on the ground floor inclusive of Transformers and RMU (RMU76FS95LV1) that delivers a supply voltage of 460V/ 3PH/ 60Hz. The HV room houses oil filled transformers whose load rating and condition could not be recorded due to non-access to the room as it was locked. The building's Main Panel located on the ground floor electrical room is rated at 1200A;
- Electrical Panels were observed to be in need of updated panel schedules and its associated labels;
- An Emergency Standby Generator (FG Wilson) and Automatic transfer switch (ATS - 800A/480V/3PH) have been installed but the Generator size rating is not labelled as well as the size of the fuel day tank;
- The ground floor parking area has two individual ground rods driven for the overall building grounding system but no evidence of independent grounding bars for communication equipment grounding were seen. Additionally, no grounding connections for MEP equipment, its associated skids and the building's structural steel frame were seen;
- The lighting fixtures installed through out the building observed were:
 - 1) 4 ft x 2 ft recessed ceiling LED flat panel fixtures that appeared to be new but no information on the wattage and warranty were provided;
 - 2) 4 ft x 1 ft external vapor proof fixtures with LED bulbs that appeared to be new but no information on the wattage and warranty were provided;
 - 3) 6" dia recessed LED downlighters with drivers that appeared to be new but no information on the wattage and warranty were provided;
 - 4) Outdoor LED Wall Pack Lights;
 - 5) LED Green Exit signs with LED Green Exit signs with battery lights installed on the ground floor;
 - 6) The small bathroom on the western end of the fifth floor did not have any light fixture and associated switch installed;

MECHANICAL, ELECTRICAL & PLUMBING (MEP)

VISUAL CONDITION SURVEY REPORT



- 7) No external lighting is installed on the roof top level where MEP plant and equipment are installed;
- The duplex power outlets that have been installed in the general office areas are all general power 115V / 1PH / 60Hz with no allowance for dedicated centralized UPS/ computer outlets for ICT related equipment required by modern office buildings;
 - A conventional Fire Alarm system has been installed with the associated smoke and heat detectors, manual pull stations and strobe lights placed within the various rooms and spaces of the building. The zones identified for the system are via each floor of the building and labelled on the main Fire Alarm Control Panel (FACP). The location of the FACP is on the ground floor next to the entrance of the internal staircase;
 - No evidence of fireproofing of the building's structure was seen as the steel beams, columns and underside of the floor slab (galvanized sheets used as formwork) bore no evidence of the application of fireproofing materials;
 - No Public Address (PA) system nor evidence of infrastructure for PA system to be installed were seen;
 - The building has labelled voice and data surface mounted outlets located on the ground floor that were connected to individual patch panels mounted on ply boards within the chase space that is located on each floor. No visible CAT 6 wiring was observed to be installed in any of the floors within the building;
 - No fibre backbone connections were observed to be installed within the building;
 - No central Uninterrupted Power Supply (UPS) with the associated equipment has been installed;
 - No IP camera system with the associated equipment (NVR, TV video wall, etc) have been installed;
 - No intrusion alarm system inclusive of door and window sensors, internal IR sensors and a security keypad was observed to have been installed;
 - An access control system that includes standard keypads (Enforcer brand) and magnetic door locks (Enforcer brand) have been installed on the ground floor;
 - A fire alarm system is installed with the main fire alarm control panel located on the ground floor with a mixture of smoke and heat detectors connected to the system. There are strobe lights, horn and pull stations installed on each floor. There is no visible evidence that this

MECHANICAL, ELECTRICAL & PLUMBING (MEP)

VISUAL CONDITION SURVEY REPORT



system is addressable nor has the ability to disable the access control door locks in the event of an alarm/fire for staff to safely exit the building.

8) PLUMBING

- The building has a total of 3000 gallons of water storage via (1) 1000 Gallon Tuff Tank located to the back of the ground floor parking lot and (2) 1000 Gallon Tuff Tanks located on the roof level of the building. It was observed that only one (1) 1000 Gallon Tuff Tank was connected to one fire pump located on the roof level. The tanks located on the roof do have stains on them from the top to the bottom of the tank with no control wires to suggest that no float mechanism is installed to prevent tank over flow;
- One 3HP/ 115/230V /1 PH / 60Hz Grundfos Multi-Stage Centrifugal Pump (Model A96522823P115160429) set with smart head was observed that serves the fire water supply to the building's fire hose reels (Tomoflex Brand) located on each floor. It was observed that one small pump on the ground floor is used with one (1) 1000 Gallon Tuff Tank to pump water to the roof level to fill two (2) additional 1000 Gallon Tuff Tanks located on the roof. One of the two tanks on the roof level is used to gravity feed as well the plumbing fixtures located on the floors below;
- The potable water pipes visible throughout the different floors of the building are PVC with the schedules unknown as the markings are not readily visible as the pipes have been painted white. The various branch and main lines additionally have a mixture of PVC and metal isolation valves installed;
- The fire water piping within the building are of a mixture of galvanized steel pipes as well as black steel pipes with both schedules unknown. There are fire landing valves installed on each floor all connected to the main dry riser valve located outside the building on St. Vincent Street.
- The plumbing fixtures seen appear to be a relative new type of fixtures which have been installed and are in good working condition. The toilets are flush tank type with the lavatory basin fixtures are push type;
- The main toilet areas and AHU rooms have floor drains with the AHU room floor drain covers to be installed and the piping to be firmly secured and painted to avoid any tripping hazards and pipe displacement;

MECHANICAL, ELECTRICAL & PLUMBING (MEP)

VISUAL CONDITION SURVEY REPORT



- No janitor rooms/closets are observed to be installed on any of the building floors per Trinidad & Tobago Plumbing Code except ground floor where it was observed a janitor sink was installed located outside to the back of the property;
- No drinking fountains except ground floor were observed but infrastructure provisions for such fountains were observed for the other office floor areas.

C) OBSERVATIONS AND RECOMMENDATIONS

MECHANICAL (HVAC, PUMPS, ELEVATOR)		
NO.	OBSERVATION	RECOMMENDATION (See Appendix I Photos)
1	Outdated and mismatched (30 Ton at 480V, 3PH) Air Handler unit was observed to be installed along with old analog thermostats. Some of the refrigerant lines are missing the required insulation with old air filters installed. One 25 Ton Air Handler Unit and Condenser with R-22 refrigerant are installed within the building. No allowance for the direct fresh air into the building required per ASHRAE was observed.	Immediate replacement of the R-22 Air Conditioning Unit equipment to a calculated size unit that is energy efficient and exceeds all ASHRAE requirements for a modern office building. All existing Air Handlers to be modified and serviced to be equipped with MERV 10 filters and calculated size fan with modifications to the AHU room and ductwork to allow for treated fresh air (filtered and de-humidified) into the spaces per ASHRAE requirements. All roof top condensers are to be treated for corrosion protection.
2	The toilet exhaust air flex ducts termination point does not appear to connect to an external louvre to expel the air outside. No final termination ducting points were observed within the drop ceiling spaces on each floor. No fresh air provisions were seen for the building per ASHRAE 62.	Installation of new main exhaust ducts to take all exhausted air outside the building via inline fans and louvered grilles. New ductwork, filters with the appropriate HVAC selected equipment to be installed to allow for fresh air and the required amount of air changes for all spaces per ASHRAE 62.
3	Main and branch ducts volume control dampers not visible. The date of the last duct cleaning was not available.	A more detailed inspection to trace and record if any all volume control dampers. A set of full as-built drawings of all air conditioning ductwork showing all dampers, diffusers and grilles to be done. All ducts to be thoroughly cleaned and sanitized with official records of date kept.

MECHANICAL, ELECTRICAL & PLUMBING (MEP) **VISUAL CONDITION SURVEY REPORT**



MECHANICAL (HVAC, PUMPS, ELEVATOR)		
NO.	OBSERVATION	RECOMMENDATION (See Appendix I Photos)
4	Toilet Exhaust Fans to be serviced and CFM checked to see if its adequate per ASHRAE 62. Janitor rooms to have exhaust as per ASHRAE 62.	If existing exhaust fans CFM are not adequate, then fans are to be replaced with one that meets or exceeds the CFM requirements per ASHRAE 62. All Janitor rooms to have exhaust air.
5	No dedicated fire pump set to serve the fire hose reels throughout the building as per NFPA 20 4.7.1. At present it appears that the fire and potable water supply shares the same duplex pump set.	A properly sized dedicated fire pump set inclusive of pump, driver and controller to be installed as per NFPA 20 to satisfy TTFS approval requirements immediately.
6	No evidence of redundant cooling systems for main IT server room of the last tenant.	Air Condition system to be modified to provide redundant cooling for all IT server rooms.
7	No evidence of automatic fire protection/ gas suppression for main IT server room of the last tenant	A calculated size gas suppression system (tank, pipework and nozzle) wired to an addressable fire alarm system to be installed.

ELECTRICAL (HV, Main LV, Generator, LV Distribution, Grounding, Lighting)		
NO.	OBSERVATION	RECOMMENDATION (See Appendix I Photos)
8	Main incoming HV lines and Oil filled Transformers testing documentation are not available.	HV testing and re-certification of cables and transformers to be done to achieve electrical inspectorate certification.
9	An Emergency Standby Generator with Automatic transfer switch (ATS) and Emergency Panel Board are installed at this site. Size of generator could not be determined as no access was granted.	The Emergency Standby Generator to be re-located with all wiring and associated accessories to be installed. An external double walled base tank to extend total runtime at full load to a minimum of 12 hrs.
10	No evidence of two independent grounding bars for general power and communication equipment grounding. Additionally, no visual confirmation of equipment, equipment skid and the building steel frame grounding connections.	Installation of individual ground bars for power and communications located in separate rooms (electrical and communications). All equipment, equipment skid and building steel frame to be connected to the overall power grounding system.

MECHANICAL, ELECTRICAL & PLUMBING (MEP)

VISUAL CONDITION SURVEY REPORT



ELECTRICAL (HV, Main LV, Generator, LV Distribution, Grounding, Lighting)		
NO.	OBSERVATION	RECOMMENDATION (See Appendix I Photos)
11	LED Lighting Fixtures have been installed but with no occupancy sensors installed in common areas such as toilet, kitchenette and storage.	All lighting fixtures that serve common areas to have occupancy sensors installed at minimum in main toilet areas, kitchenette, conference rooms and storage rooms.
12	Duplex power outlets installed in the general office areas are all normal 115V / 1PH with no allowance for dedicated UPS/ computer outlets for IT related equipment as seen in modern office buildings.	Additional duplex power outlets for ICT equipment to be installed connected to a dedicated power panel that is powered by a central dedicated UPS.
13	Majority of the existing Voice and Data outlets wiring are Cat 5/5e. Main patch panel rating is Cat 5e. No main fibre backbone cabling installed.	End user to assess the network backbone needs with a final determination on if to upgrade all Cat 5/5e wiring and main patch panel to Cat 6 type at minimum. A new single mode OM4 fibre backbone to be installed with a minimum of 8 Cores.
14	No central Uninterrupted Power Supply (UPS) with the associated equipment has been installed.	A calculated sized central UPS with the associated equipment to be installed.
15	No IP camera system with the associated equipment has been installed.	An IP based camera system with all the associated equipment for a complete system to be installed with a minimum recording storage time of 30 days at the maximum camera resolution for a minimum of 5 MP @ 25 fps.
16	An intrusion alarm with door and window sensors, IR sensors and security keypad was not observed to be installed throughout.	Intrusion alarm system with all its components to be installed for main entry and exit doors as well as window sensors to be installed where needed.
17	An Access Control system via keypad (Enforcer brand) and magnetic door locks (Enforcer brand) have been installed on the ground floor only.	An updated Access Control system to be installed with card access, no touch exit buttons and biometric readers as per architect's schedule of accommodation. Existing keypad can be re-used for other rooms where these specific card access types will not be installed.
18	No Public Address system has been installed.	A public address system to be installed.

MECHANICAL, ELECTRICAL & PLUMBING (MEP)

VISUAL CONDITION SURVEY REPORT



ELECTRICAL (HV, Main LV, Generator, LV Distribution, Grounding, Lighting)		
NO.	OBSERVATION	RECOMMENDATION (See Appendix I Photos)
19	Main Fire Alarm System is not addressable and is not connected to the access control system. Different models of smoke and heat detectors have been installed.	An updated Addressable Fire Alarm System to be installed with all compatible devices (pull stations, horn & strobe, detectors, etc). This updated system must be able to deactivate the Access Control system when triggered.

PLUMBING (Potable Water, Sewer, Fire Protection, Fire Gas Suppression)		
NO.	OBSERVATION	RECOMMENDATION (See Appendix I Photos)
20	The potable water and fire pumps are shared via one duplex pump set.	A properly sized dedicated separate pump set inclusive of control panel and skid for the fire water is to be installed. The existing duplex pump set to be serviced and reconditioned as new to serve only the potable water supply. One appropriately sized booster duplex pump with Pressure Vessel/Tank to be installed on the ground floor.
21	Some isolation valves material type installed are plastic while others are metal.	Replace all plastic isolation valves with the metal material type.
22	The fire water supply piping above ground may not be carbon steel SCH 40 as required by code. It appears that galvanized steel pipes painted white have been used. No verification that any corrosion protection coating have been applied to all fire water supply piping.	Material testing of pipes to determine the exact type of pipes used. If not carbon steel SCH 40, all fire supply piping throughout has to be re-done, re-tested and to obtain TTFS approval.
23	Total water storage on site (potable and fire) is provided via (1) 1000 Gallon Tuff Tank at the ground level with another (2) 1000 Gallon on the roof level for a total of 3000 Gallons.	A proper calculated storage figure for both potable water and fire water per WASA and NFPA requirements are to be done. WASA from past outline approvals have asked for a minimum of (2) two days calculated water storage. Building maybe classified as a Class II per NFPA thus a minimum flow rate of 100 gpm at 65 psi and as such the fire water storage will have to be increased. A appropriately sized water commercial filter to be installed on the incoming main before the tank farm.

MECHANICAL, ELECTRICAL & PLUMBING (MEP) **VISUAL CONDITION SURVEY REPORT**



PLUMBING (Potable Water, Sewer, Fire Protection, Fire Gas Suppression)		
NO.	OBSERVATION	RECOMMENDATION (See Appendix I Photos)
24	All visible potable and waste pipes seen showed no visible signs of cracks nor leaks.	All pipes are to be pressure tested and recorded to ensure pipe and fittings would not leak under full operation of the building.

D) CONCLUSION / REMARKS

Based on the visual inspection, the existing building appears to have the majority of the Mechanical, Electrical & Plumbing (MEP) systems installed at the time of this visual inspection. However, there is the immediate need of the various MEP systems identified to be either newly installed, replaced or upgraded for the intended uses specific to the requirements of the Gambling (Gaming and Betting) Control Commission occupancy and operations.

The observations and recommendations indicated in **Section C** above should be carried out at a minimum in conjunction with the Architectural, Civil/Structural recommended works identified in such other documents to comply with OSHA, Local Statutory Authorities and other relevant current design standards and codes. Before any execution of works, the proponent is required to do an MEP assessment to confirm the recommendations and any un-identified MEP issues required for project functionality are to be brought to the attention of the Employer.

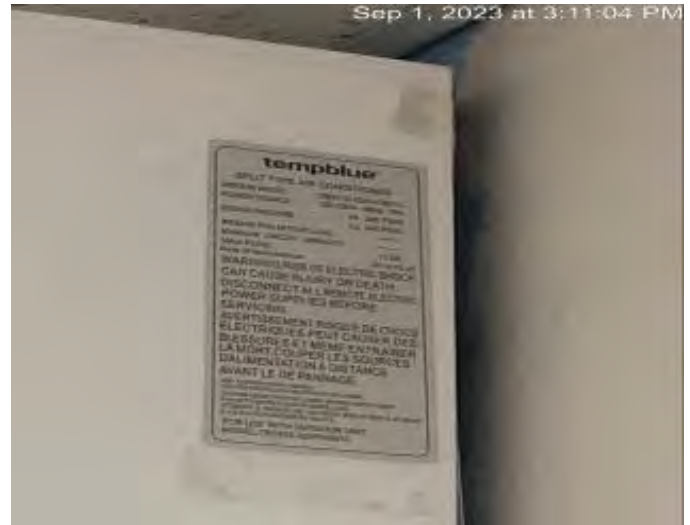
MECHANICAL, ELECTRICAL & PLUMBING (MEP) **VISUAL CONDITION SURVEY REPORT**



E) APPENDIX I (Photos)



Tempblue 2 Ton Split Unit located in ground floor reception area.



Tempblue 2 Ton Split Unit located in ground floor reception area.

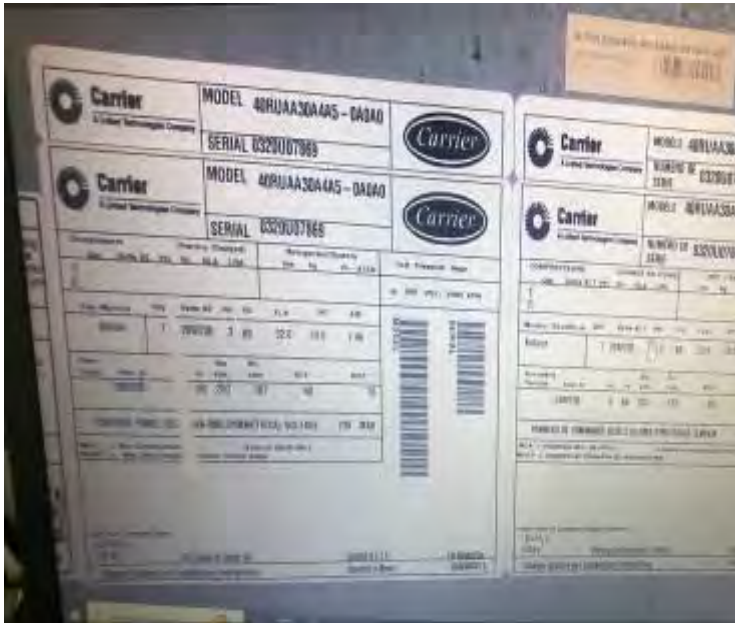


Carrier Air Handler Unit dual coil piping set up



Air Handler Unit old Thermostat connection to unit. Digital Thermostat installed in room but connection to unit cannot be traced

MECHANICAL, ELECTRICAL & PLUMBING (MEP) VISUAL CONDITION SURVEY REPORT



Carrier 30 Ton Air Handler Unit



Carrier Air Handler Unit set up



Carrier Air Handler Unit with non-MERV rated filters installed



Typical Air Handler Unit Room Lourved Door

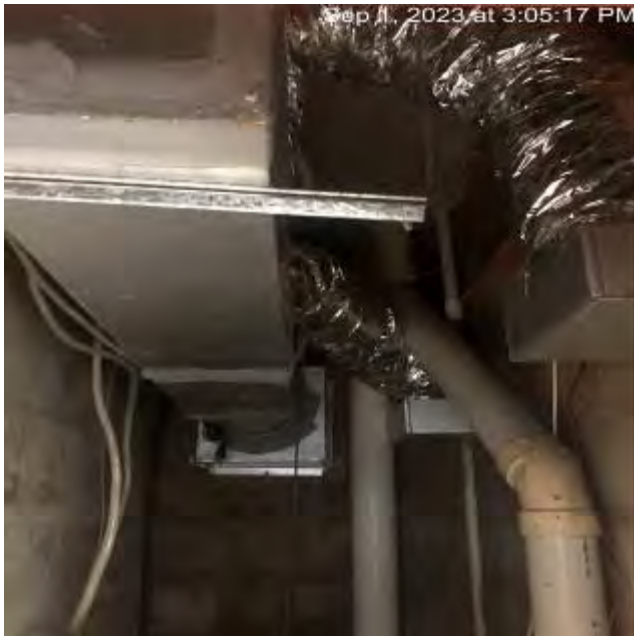
MECHANICAL, ELECTRICAL & PLUMBING (MEP)
VISUAL CONDITION SURVEY REPORT



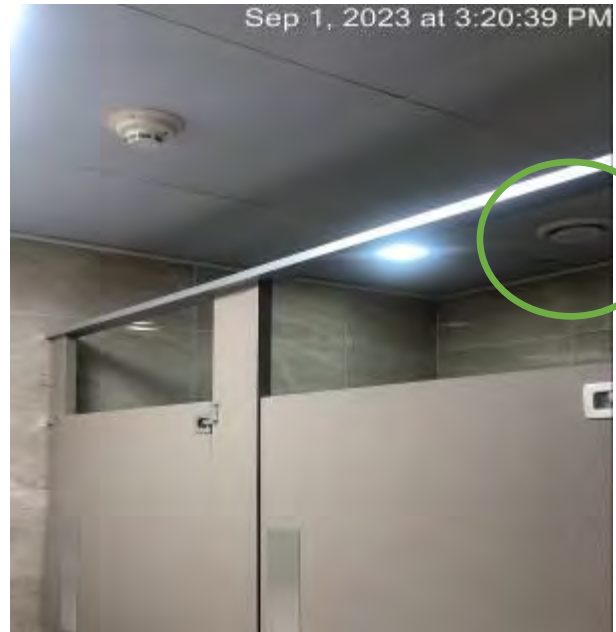
Air Conditioning Condensers located on Roof Level



Air Conditioning Condensers located on Roof Level



Ground Floor Toilets Exhaust Fan and Ductwork

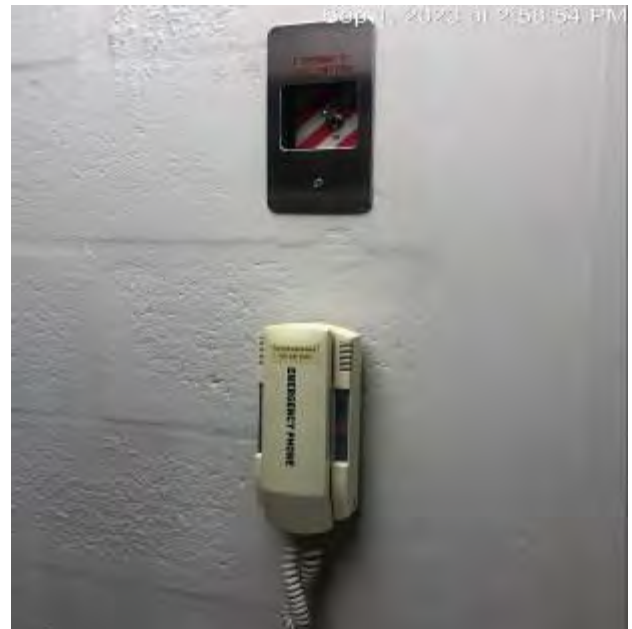


Typical Toilet ceiling plan with circular exhaust grille

MECHANICAL, ELECTRICAL & PLUMBING (MEP)
VISUAL CONDITION SURVEY REPORT



Kone 13 Passenger Elevator



Fireman's Lift Switch and Phone



Ring Main Unit Room



Transformer Room

MECHANICAL, ELECTRICAL & PLUMBING (MEP) VISUAL CONDITION SURVEY REPORT



T&TEC C.T and Meter Cabinets



Main Panel Board and Emergency Board



ASCO ATS Rating



Emergency Board with ASCO ATS

MECHANICAL, ELECTRICAL & PLUMBING (MEP)
VISUAL CONDITION SURVEY REPORT



FG Wilson Generator (Capacity unknown)



FG Wilson Generator (Capacity unknown)



Electrical Panel with Panel Schedule to update

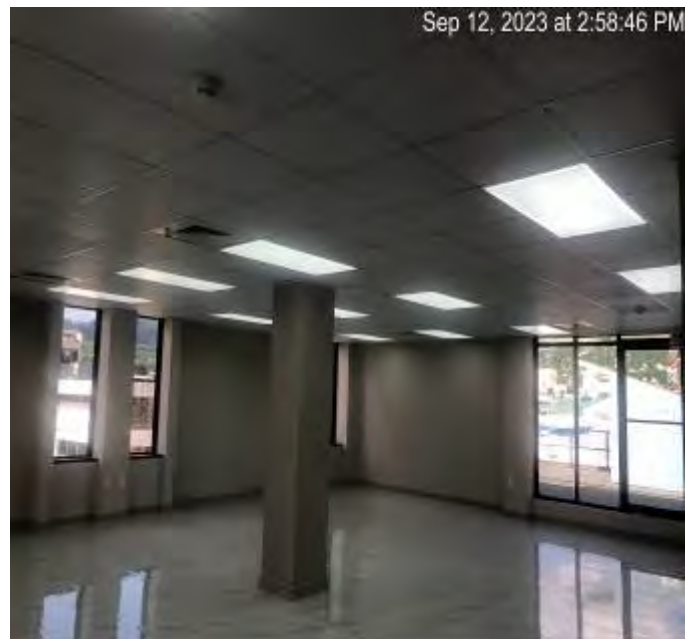


Electrical Panel with Panel Schedule to update

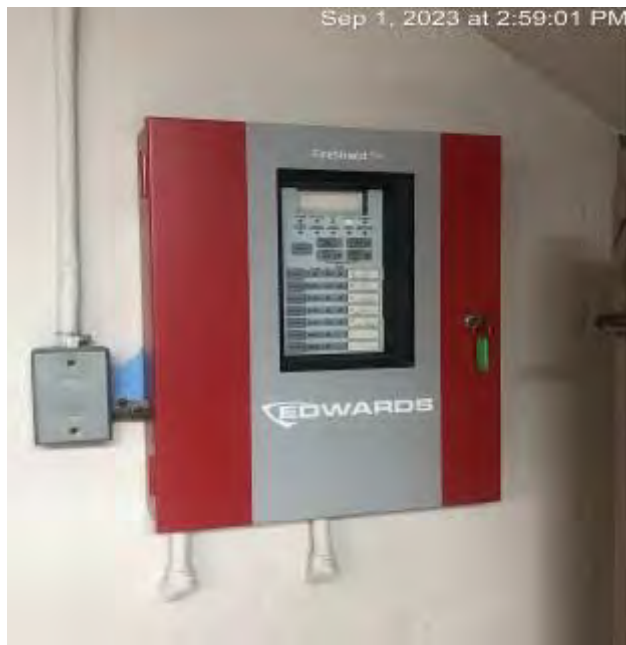
MECHANICAL, ELECTRICAL & PLUMBING (MEP) **VISUAL CONDITION SURVEY REPORT**



Typical LED Ceiling Light Fixtures



**Typical Reflected Ceiling Layout with LED Lights,
AC Supply Grilles and Smoke Detectors**



Main Fire Alarm Panel on Ground Floor



Typical Fire Hose Reel and Fire Extinguisher

MECHANICAL, ELECTRICAL & PLUMBING (MEP)
VISUAL CONDITION SURVEY REPORT



Communications Patch Panel



Typical Voice/Data Outlet on Ground Floor



Building Main Fire Dry Riser



Building Main Riser Outlet located on each floor

MECHANICAL, ELECTRICAL & PLUMBING (MEP)
VISUAL CONDITION SURVEY REPORT



Ground Floor Booster Pump



Ground Floor 1000 Gallon Water Tank

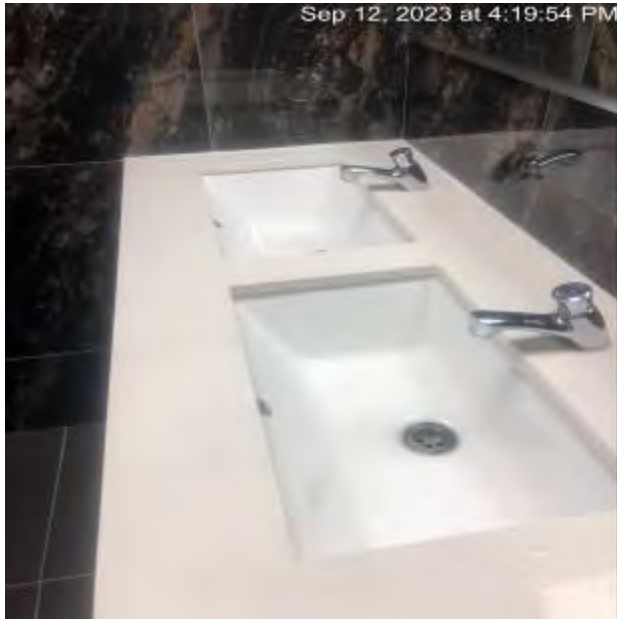


Building Potable & Fire Water Tanks on Roof Level



Building Potable Water & Fire Pump on Roof Level

MECHANICAL, ELECTRICAL & PLUMBING (MEP)
VISUAL CONDITION SURVEY REPORT



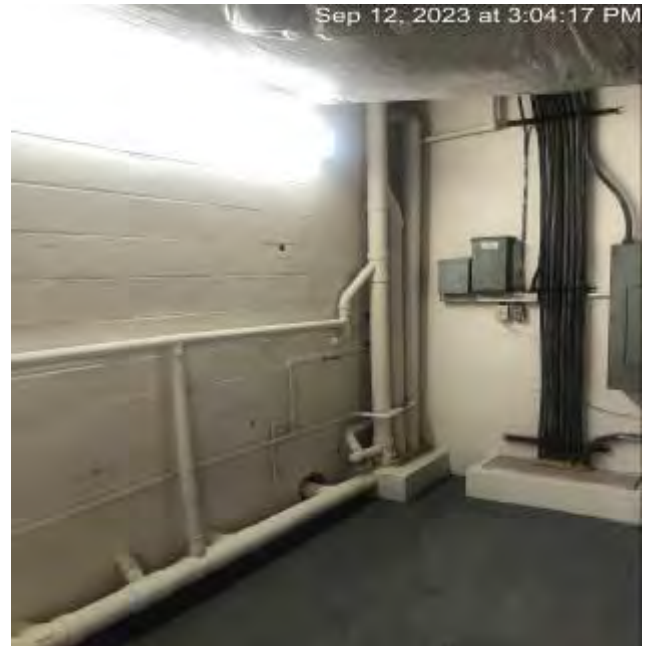
Typical Toilet LB with fixtures



Typical Toilet WC with Tank fixture



Typical Toilet Waste & Revent Lines in AHU Room

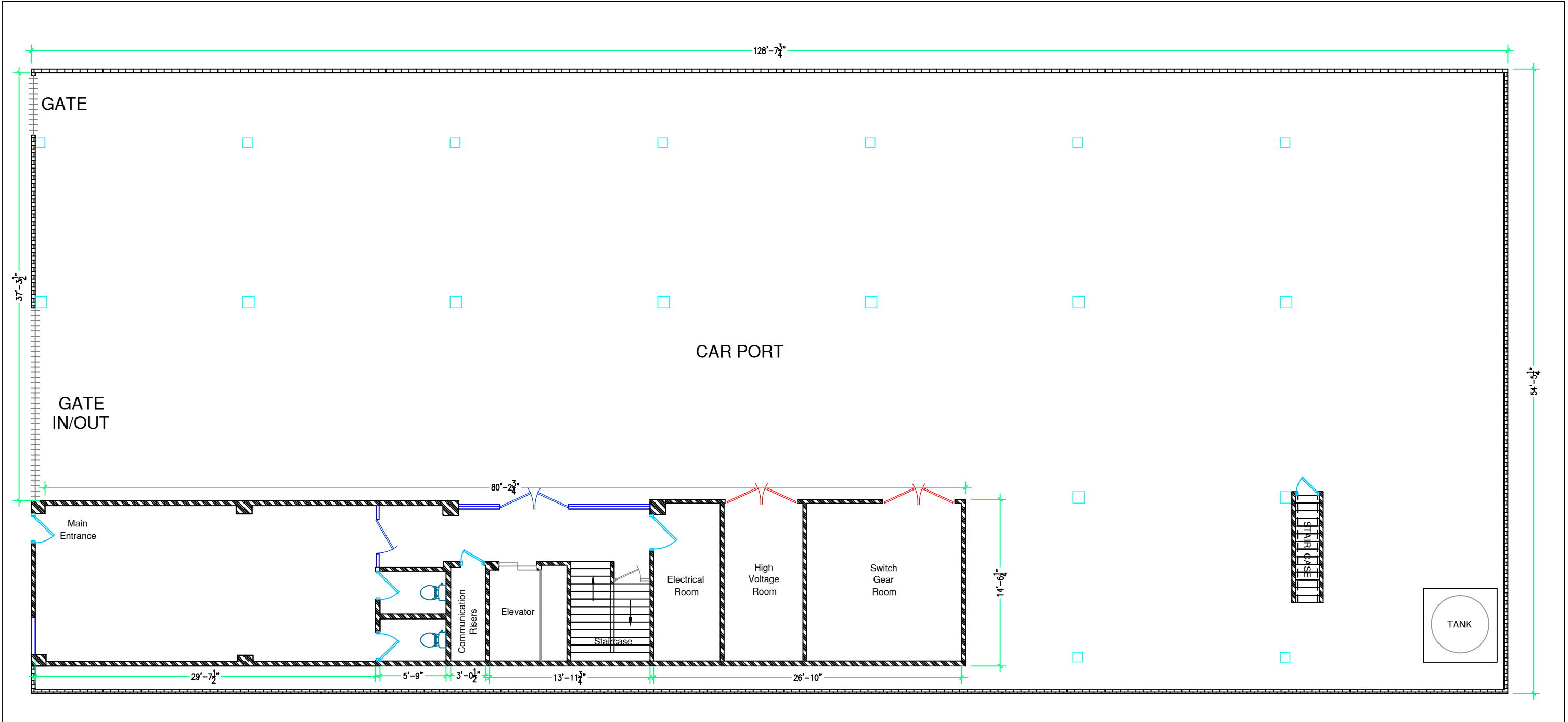


Typical Toilet Waste & Revent Stacks in AHU Room

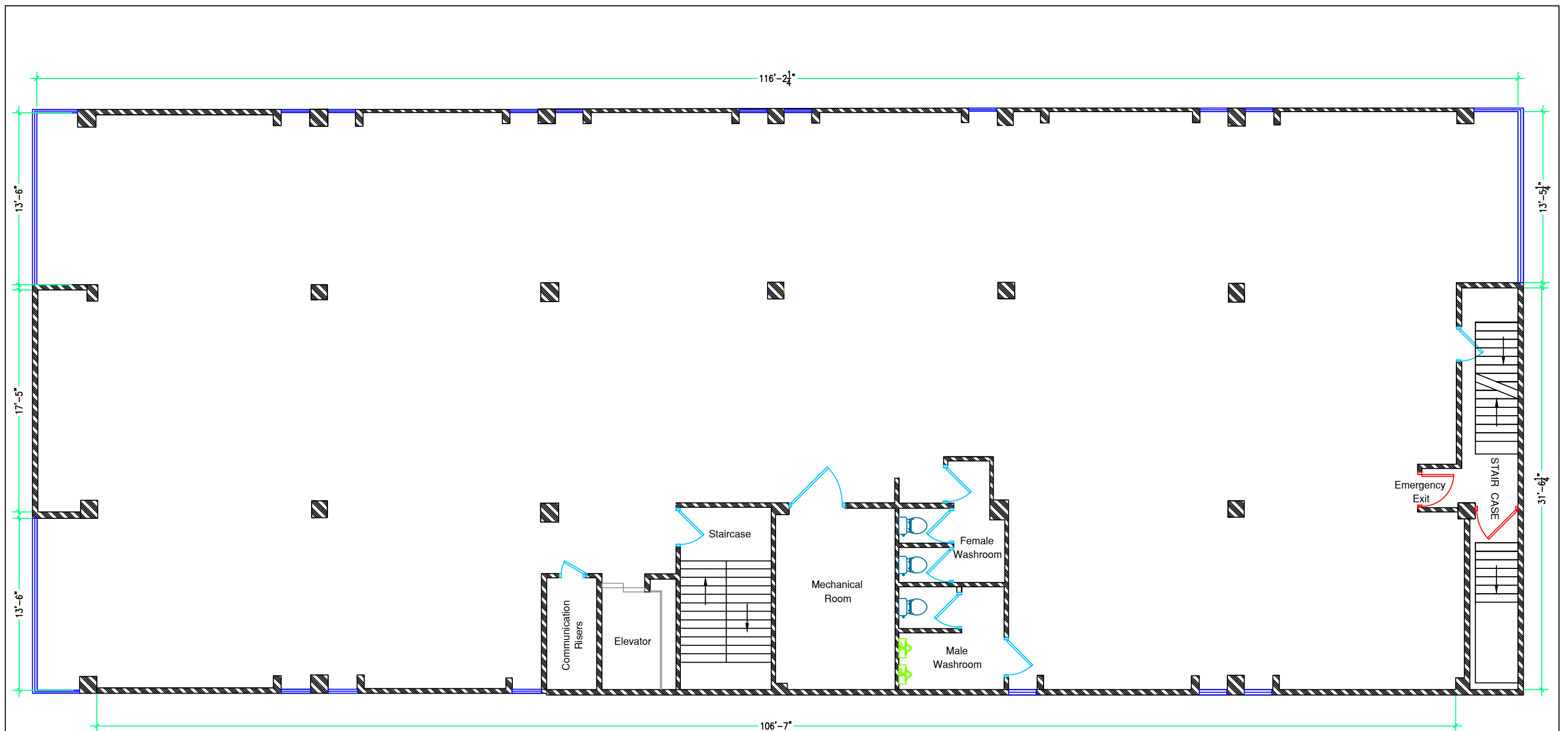
MECHANICAL, ELECTRICAL & PLUMBING (MEP)
VISUAL CONDITION SURVEY REPORT



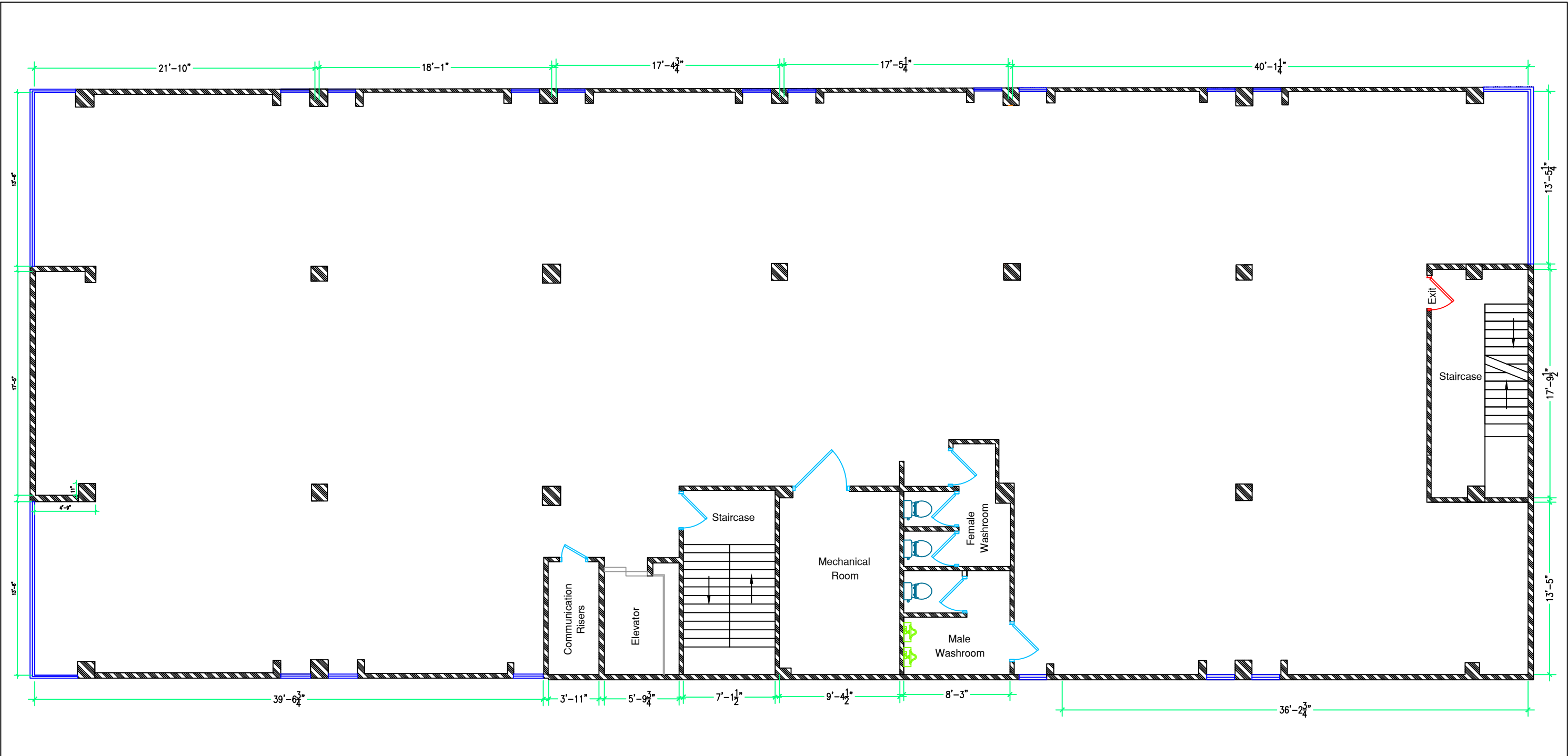
E) APPENDIX II (As-Built Architectural General Floor Plans)



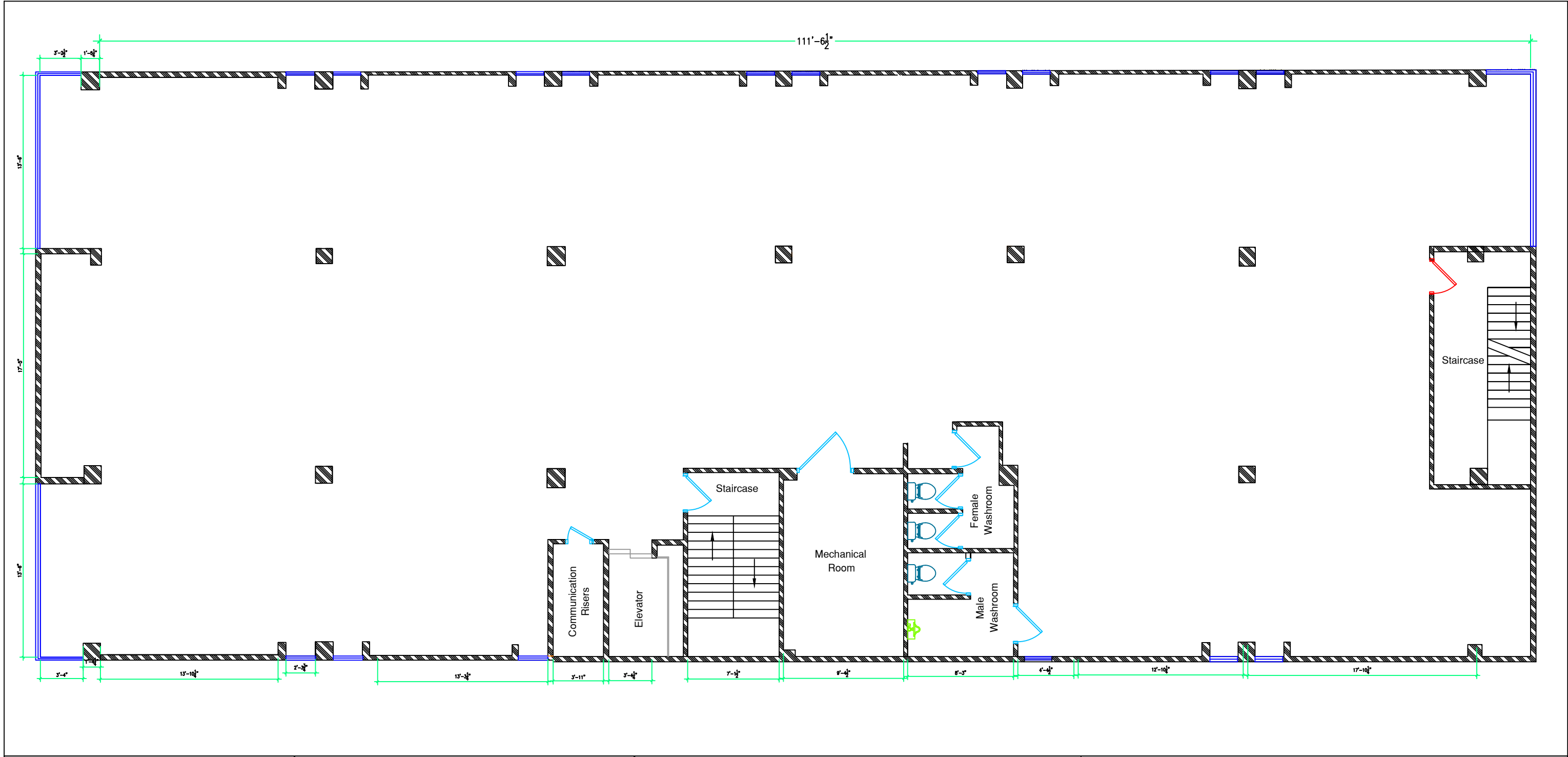
J.M FERRY & COMPANY LTD. #24 Crawford Street, Vistabella, San Fernando, Trinidad Email : kerrl.seenath@jmferryll.com " Your Total Office Solution Company "		TEL: (868) 657 - 0118 FAX: (868) 653 - 2521
Project: OFFICE BUILDING - 76-78 ST VINCENT STREET-P.O.S	Date: 20/01/2020	
Dwg. Title: EXISTING BUILDING PLAN	DWG #: GROUND FLOOR	
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NOTES: Existing Concrete Walls Existing Glass Existing Perimeter Concrete Walls		REVISED ON: All measurements are to be confirmed on site



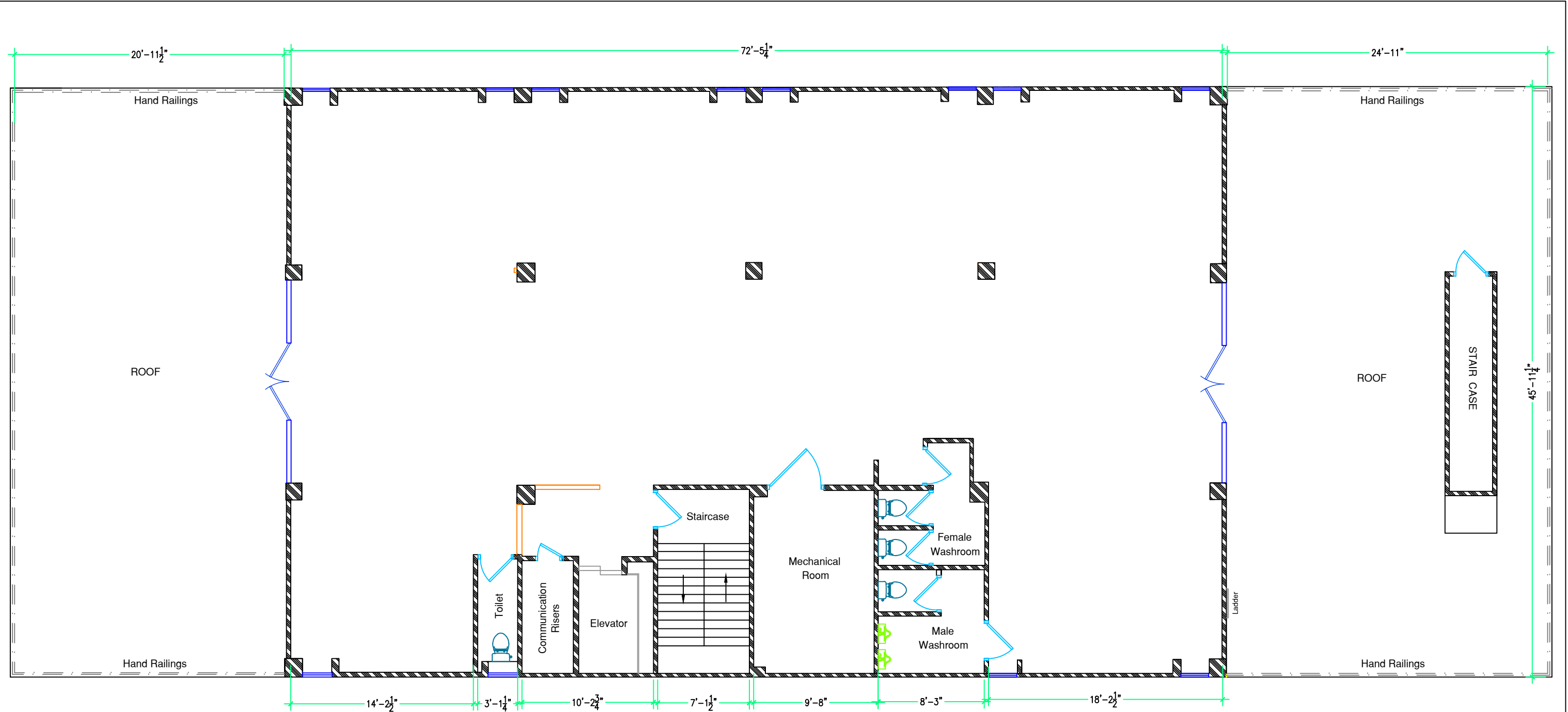
J.M FERRY & COMPANY LTD. #24 Crawford Street, Vistabella, San Fernando, Trinidad Email : kerri.seenath@jmferrytt.com TEL: (868) 657 - 0118 " Your Total Office Solution Company" FAX: (868) 653 - 2521		NOTES: Existing Concrete Walls Existing Gypsum Wall Existing ½" Gypsum Wall ½" Glass Existing Glass		REVISED ON <i>All measurements are to be confirmed on site</i>	
Project: OFFICE BUILDING - 76-78 ST VINCENT STREET-P.O.S Draw Title: EXISTING BUILDING PLAN		Date: 29/01/2020 DWG #: LEVEL 1			
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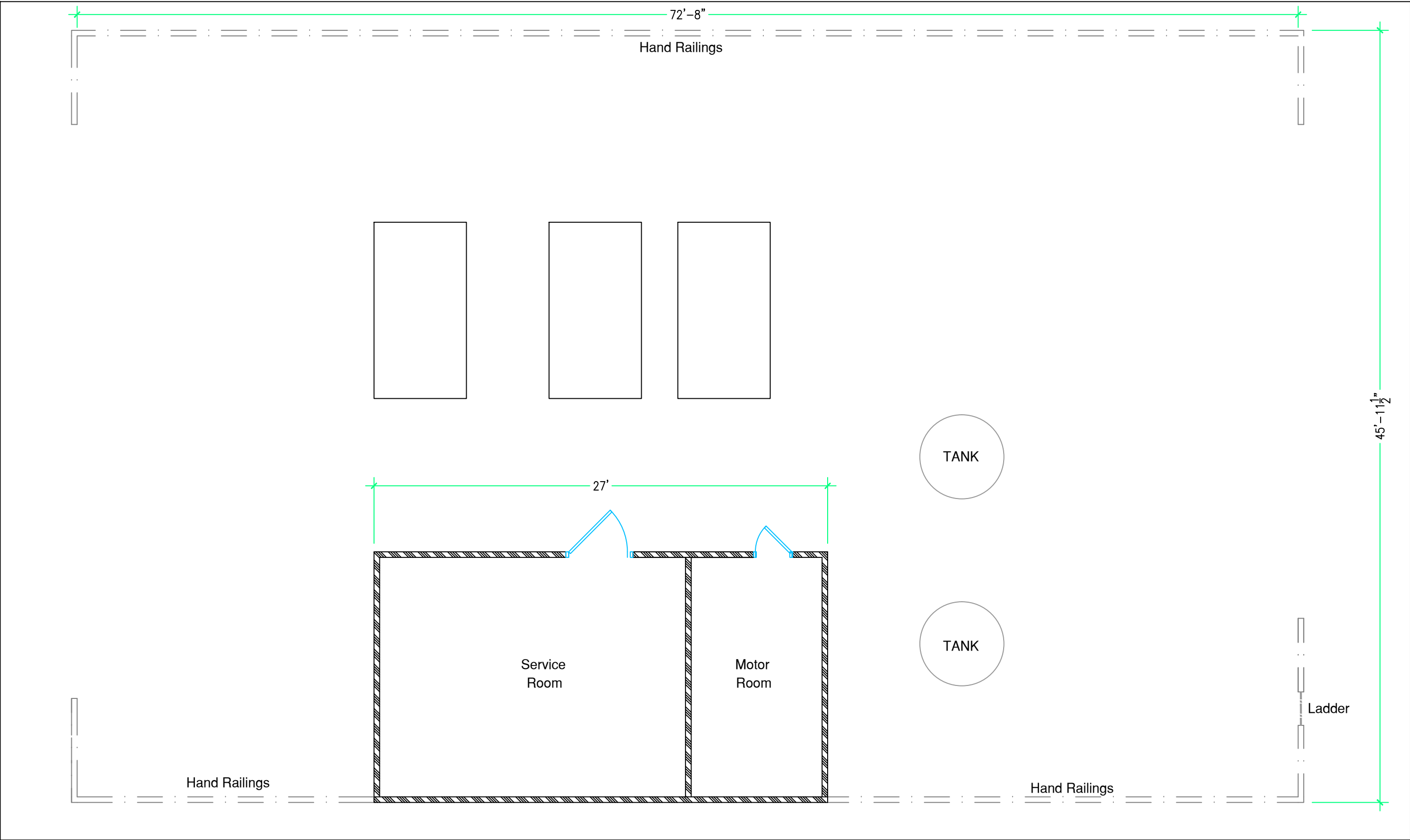
J.M FERRY & COMPANY LTD. #24 Crawford Street, Vistabella, San Fernando, Trinidad Email : kerri.senath@jmferrytll.com "Your Total Office Solution Company"		TEL: (868) 457 - 0118 FAX: (868) 653 - 2521	
Project: OFFICE BUILDING - 76-78 ST VINCENT STREET-P.O.S	Date: 29/01/2020	NOTES: <div><div>Existing Concrete Walls</div><div>Existing Gypsum Wall</div><div>Existing Glass</div></div>	
Dwg. Title: EXISTING BUILDING PLAN	DWG #: LEVEL 2		
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		REVISED ON	
		All measurements are to be confirmed on site	



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Project: OFFICE BUILDING - 76-78 ST VINCENT STREET-P.O.S	Date: 29/01/2020				
Dwg. Title: EXISTING BUILDING PLAN	DWG P: LEVEL 3				
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Project: OFFICE BUILDING - 76-78 ST VINCENT STREET-P.O.S		Date: 29/01/2020			
Dwg. Title: EXISTING BUILDING PLAN		DWG #: LEVEL 4			
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TEL: (868) 657 - 0118 FAX: (868) 653 - 2521			
Project: OFFICE BUILDING - 76-78 ST VINCENT STREET-P.O.S	Date: 29/01/2020	NOTES:  Existing Concrete Walls	
Dwg. Title: EXISTING BUILDING PLAN	DWG #: LEVEL 5		
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SCALE: AS SHOWN		REVISED ON: All measurements are to be confirmed on site	

CONTRACTOR ESTIMATE - GAMBLING CONTROL COMMISSION CORPORATE OFFICE

CLIENT: GAMBLING (GAMING & BETTING) CONTROL COMMISSION

PROJECT: GAMBLING CONTROL COMMISSION CORPORATE OFFICE

SCOPE: CONSTRUCTION & OUTFITTING WORKS

JOB LOCATION: ST. VINCENT STREET, PORT OF SPAIN

DATE: 10-Nov-23

CURRENCY: TTD



PREAMBLE TO BILL OF QUANTITIES		
1.00	General	NOTE
1.01	Attention is directed to the Invitation to Tender the Specification and drawings. These documents are to be read in conjunction with the Bill of Quantities.	
2.00	Pricing and Measurement	NOTE
2.01	The prices and rates to be inserted in the bill of Quantities are to be full inclusive value of the work described under the several items, including all costs and expenses which may be required in and for the construction of the work described, together with all general risks, liabilities and obligations set forth or implied in the documents on which the tender is to be based; where special risks, liabilities and obligations cannot be dealt with as above, then the price thereof is to be separately stated in the item or items provided for the purpose.	
2.02	A price rate is to be entered against each item in the Bill of Quantities, whether quantities are stated or not. Items against which no price is entered shall be considered as covered by the other prices or rates in the bill.	
2.03	Any special methods of measurement used are stated at the head of or in the text of the Bill of Quantities for the trades or items affected. All other items are measured net in accordance with the drawings and no allowance has been made for waste.	
2.04	All measurements in the bill are taken strictly net. The principle of net measurement shall apply to all work executed under the Contract and no claims for extras based upon other methods of measurement will be entertained.	
	The prices and rates entered in the Bill shall include the following unless specified:	
2.05	Generally All obligations imposed by the Contract.	NOTE
2.06	Complying in every respect with the requirements and the considerations of the specifications and drawings.	
2.07	All considerations arising from the definitions incorporated into each preamble section.	
2.08	Labour Labour for careful removal, handling, installing and all associated costs, including but not limited to salaries, wages, other emoluments and allowance.	NOTE
2.09	Any additional labours usually associated with measured items.	
2.10	Materials Prices of Material or goods required for the scope of works obtain by the Contractor from Manufacturers' or stocklist including the cost of delivery and handling to the site.	NOTE
2.11	All duties taxes and other levies payable.	
2.12	Transport Transportation and equipment required in undertaking the works.	NOTE
3.00	Reference To Specifications	NOTE
3.01	General directions and descriptions of work and material given in the specification may not necessarily be repeated in the Bill of Quantities. Reference is to be made to the specification for this information.	
4.00	Preparation of Tenders	NOTE
4.01	In preparing this tender and pricing the items in the Bill, the Tenderer must cover himself and shall be deemed to have covered himself for:	
4.02	All services and materials which according to the true intent and meaning the tender Documents may reasonably infer as necessary for carrying out in good and workman-like manner the works shown upon the Drawings, described in the Specification whether expressly mentioned therein or not.	
4.03	All duties, obligations, liabilities and responsibilities which any of the Tender documents place upon the Contractor in connection with or in relation to this contract.	
4.04	The Tenderer shall insert against each item in the Bill, such rates and prices as he may deem necessary to cover the above requirements. Items shall not be bracketed together and where no rate or price is inserted against any item in the Bill, the cost thereof shall be deemed to have been included and spread proportionately over all items priced by the Tenderer.	
4.05	Unless separate items are provided, the cost of all specified tests and the supply of all Test Certificates shall be included in the rates in the Bill of Quantities.	

PREAMBLE TO BILL OF QUANTITIES		
5.00	Contractor's Obligations	NOTE
5.01	The information in the Tender Documents as to the whereabouts and classifications of existing services and mains is believed to be correct but the Contractor shall not be relieved of his obligations under the Conditions of Contract. The Contractor shall include in his rates for keeping the Engineer informed of all arrangements he makes with the Statutory Authorities as appropriate and for ensuring that no existing mains and services are interrupted without the written consent of the appropriate authority.	
6.00	Quantities	NOTE
6.01	The tenderer shall satisfy himself as to the quantities involved, including materials and equipment and conditions of work involved having due regard to the fact that the description of the quantities of work and materials as included in the Bill of Quantities is brief and intended only to indicate the general nature of the work and to identify the said quantities with the detailed requirements of the tender documents.	
7.00	Claims For Further Payment	NOTE
7.01	The Contractor shall have no claims for further payment in respect of any work or method of execution which may be described in this Contract although no item appears in the Bill of Quantities which may specifically correspond to the said work or method of execution.	
8.00	Requests For Additional Information	NOTE
8.01	If the prices for items of work, in the opinion of the Engineer, are not realistic prices for the particular item of work/s, the Engineer may request additional information to substantiate the prices.	
9.00	Tender Rates	NOTE
9.01	The rates entered by the Tenderer in the Bill for taking delivery of materials from the Employer shall include inter alia for taking delivery, transporting to site, storing etc. and no separate claims for profits, etc. on the cost price of such material will be entertained.	
10.00	Completion Of Bill Of Quantities	NOTE
10.01	All blank spaces in the Bill of Quantities and the Form of Tender must be filled in ink in both words and figures where required. No change shall be made in the phraseology of the forms. In case of discrepancy between the amounts stated in words and amounts in figures, the former shall govern.	
11.00	Provisional / Prime Cost / Contingency	NOTE
11.01	No items for which a Provisional/Prime Cost/Contingency Sum is inserted shall be undertaken by the Contractor until the Engineer has given written instruction to this effect. The Contractor may be required to obtain competitive quotations and samples, if required and submit these to the Engineer for Approval. It shall be the duty of the Contractor to make an application to the Engineer sufficiently in advance of the progress of the work for instruction with regard to each Provisional/Prime Cost/Contingency Sum.	
11.02	Provisional/Prime Cost/Contingency Sums inserted in the Bill in respect of materials to be specially imported for this Contract by the Contractor shall be deemed to include insurance, freight, dock and all other charges involved in clearing materials from the dock. In the case of imported materials obtained through a manufacturer agent in Trinidad, the Provisional/Prime Cost/Contingency Sums shall be deemed to include in addition to the agent's fees and charges.	

CONTRACTOR ESTIMATE - GAMBLING CONTROL COMMISSION CORPORATE OFFICE

CLIENT: GAMBLING (GAMING & BETTING) CONTROL COMMISSION
 PROJECT: GAMBLING CONTROL COMMISSION CORPORATE OFFICE
 SCOPE: CONSTRUCTION & OUTFITTING WORKS
 JOB LOCATION: ST. VINCENT STREET, PORT OF SPAIN
 DATE: 10-Nov-23
 CURRENCY: TTD



PROJECT SUMMARY

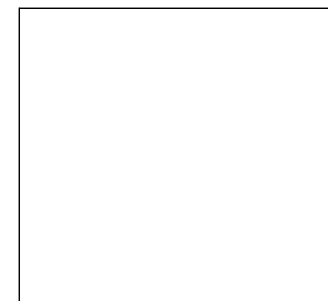
NO	DESCRIPTION	TOTAL
		(VE)
A	PRELIMINARIES & DESIGN FEES	
1.00	PRELIMINARIES	
2.00	DESIGN FEES	
	PRELIMINARIES & DESIGN FEES - SUB TOTAL	
B	BUILDING WORKS	
3.00	DEMOLITION WORKS	
4.00	CONSTRUCTION WORKS	
5.00	FURNITURE, FURNISHING & EQUIPMENT	
	BUILDING WORKS - SUB TOTAL	
C	EXTERNAL WORKS	
6.00	CONSTRUCTION WORKS	
	EXTERNAL WORKS - SUB TOTAL	
	TOTAL (A)	VE
	VALUE ADDED TAX	12.50%
	TOTAL (B)	VI

CONTRACTOR NAME: _____

NAME: _____

SIGNATURE: _____

POSITION: _____



COMPANY STAMP

DATE: _____

CONTRACTOR ESTIMATE - GAMBLING CONTROL COMMISSION CORPORATE OFFICE

CLIENT: GAMBLING (GAMING & BETTING) CONTROL COMMISSION

PROJECT: GAMBLING CONTROL COMMISSION CORPORATE OFFICE

SCOPE: CONSTRUCTION & OUTFITTING WORKS

JOB LOCATION: ST. VINCENT STREET, PORT OF SPAIN

DATE: 10-Nov-23

CURRENCY: TTD



BILL OF QUANTITIES

NO	DESCRIPTION	QTY	UNIT	RATE	TOTAL (VE)
1.00	PRELIMINARIES				
1.01	This will include all site management, supervision, insurances, bonds, accomodation, power, testing, safety, storage, workers welfare, cleaning, security, scaffolding, transport etc.				
	PRELIMINARIES - SUB TOTAL				
2.00	DESIGN FEES				
2.01	Design Fess for Project				
	DESIGN FEES - SUB TOTAL				
3.00	DEMOLITION WORKS				
3.01	Demolition and carting away of walls, ceiling, floors etc. as required. Location of disposal to be determined.				
	DEMOLITION WORKS - SUB TOTAL				
4.00	CONSTRUCTION WORKS				
	SUPER STRUCTURE				
	STRUCTURAL REPAIRS / REHABILITATION				
4.01	Structural Repairs - Structural repairs / rehabilitation works to all existing load bearing, and non load bearing members as required. This will include, but not limited to spalling to concrete, corrosion of structural steel, and reinforcement, cracking of walls, and reinforced concrete members, deficiencies in existing staircases, structural analysis and assessment, etc. Completed works will be fit for purpose.				
	WALLS				
4.02	Masonry Wall - Construction of 4 - 6" thick masonry walls inclusive of all reinforcement, stiffners, beams, filling of cores, and rendering to both sides. Average height of walls 3.00m				
4.03	Moveable Walls - Supply and install high quality moveable walls (Approximately 2.40m (H) x 12.00m (L) with a minimum STC Rating of 45. This will include all materials, equipment, builders work, fasteners, finishes, etc.				
4.04	Gypsum Board - Supply and install gypsum walls with a minimum STC Rating of 45. This will be inclusive of all framing, supports, insulation, surface preparation for painting, etc.				
	FINISHES				
	Floor				
4.05	Roof Tile - Supply and install high quality commercial grade roof tile inclusive of all cutting, trims, adhesives etc.				
4.06	LVT, Porcelin & Carpet Tiles - Supply and install high quality LVT, porcelin & carpet tiles. This will be inclusive of all materials, trims, adhesives, thresholds, etc.				
4.07	Rubber Flooring - Supply and install high quality commercial grade interlocking rubber gym flooring. This will be inclusive of all materials, underlay, cutting, trims, adhesives, etc.				
	Wall				
4.08	Tiles - Supply and install high quality porcelin tiles inclusive of all cutting, grouting, adhesives etc.				
4.09	Painting - Prepare surface and apply one (1) coat primer and two (2) coats finishing paint to all interior and exterior walls as required.				
	PLUMBING				
4.10	Handicap Washrooms Suites - Supply and install water closets inclusive of all venting, plumbing fixtures, fittings, hardware, rails, fasteners, sealant, adhesive, hardware, accessories, etc.				
4.11	Washrooms - Supply and install water closets inclusive of all venting, plumbing fixtures, fasteners, sealant, adhesive, hardware, etc.				
4.12	Showers - Supply and install showers inclusive of all plumbing fixtures, fasteners, sealant, adhesive, hardware, etc.				
4.13	Face Basin Sinks - Supply and install sinks inclusive of all venting, plumbing fixtures, fasteners, sealant, adhesive, hardware, etc.				

NO	DESCRIPTION	QTY	UNIT	RATE	TOTAL
					(VE)
4.14	Kitchen Sinks - Supply and install metal double kitchen sinks with drain boards, inclusive of all venting, plumbing fixtures, fasteners, sealant, adhesive, hardware, etc.				
4.15	Janitor's Sink - Supply and install jantor's sink inclusive of all venting, plumbing fixtures, fasteners, sealant, adhesive, hardware, etc.				
4.16	Plumbing Works - Supply and install new plumbing lines, fittings, fixtures, equipment, infrastructure works, builders works etc.				
4.17	Existing Plumbing - Termination, re-routing, re-alignment and condemning of existing plumbing works as deemed necessary.				
	ELECTRICAL				
4.18	Electrical Works - Supply and install electrical works as required. This will include all wires, conduits, breakers, panels, cables, lighting fixtures, electrical poles, switches, sockets, outlets, sensors, power packs, telephone lines, electrical panel, incoming service, earthing / grounding, pad mounted transformers, metering, distribution, secondary transformers, infrastructure, terminal devices, transient voltage surge suppressors, fittings, builders work, testing, commision, handover documentation, liasing with statutory authorities, warranties etc.				
4.19	Existing Electricals - Termination, re-routing, re-alignment, and condemning of existing electrical works as deemed necessary.				
	HVAC				
4.20	HVAC Works - Supply and install HVAC works as required. This will include all evaporators, condensors, air handlers, fan coil unit, ducting (hard & flex), diffusers, refrigerant lines, exhaust fans, returns, condensate lines, thermostats, tempered air, builders work, testing, commision, handover documentation, liasing with statutory authorities, warranties etc.				
4.21	Existing HVAC - Termination, re-routing, re-alignment and codemning of existing HVAC works as deemed necessary.				
	IT, DATA, UPS, PA SYSTEM, ACCESS CONTROL & SECURITY SYSTEM				
4.22	IT & Data - Supply and install IT & Data works as required. This will include all cables, wiring, equipment, builders works, testing, commision, handover documentation, liasing with statutory authorities, warranties etc.				
4.23	Existing IT & Data - Termination, re-routing, re-alignment, and condemning of existing IT & Data works as deemed necessary.				
4.24	UPS System - Supply and install high quality UPS System inclusive of all equipment, cables, hardware, fasteners, builders work, testing, commision, handover documentation, liasing with statutory authorities, warranties etc.				
4.25	Security System - Supply and install high quality CCTV security cameras, intrusion alarms and monitors to all internal and external areas as required. This will be inclusive of all equipment, wires, cables, sensors, recording equipment, key pads, fasteners, supports, brackets, builders work, testing, commision, handover documentation, liasing with statutory authorities, warranties etc.				
4.26	Access Control - Supply and install high quality no touch point and biometric system. This will be inclusive of all equipment, software, wires, cables, fasteners, supports, brackets, builders work, testing, commision, handover documentation, liasing with statutory authorities, warranties etc. No touch system to be installed as required as by the Schedule of Accomodation. Biometric system to be installed one (1) per floor and four (4) for IT rooms.				
4.27	PA System - Supply and install high quality PA System, inclusive of all speakers, amplifiers, wires, enclosures, grills builders work, testing, commision, handover documentation, liasing with statutory authorities, warranties etc.				
	FIRE DETECTION & SUPRESSION				
4.28	Fire System - Supply and install all fire alarms, smoke detectors, firelines, hose reels, sprinkler systems, fire extinguishers, control panels, heat detectors, fire pumps, water tanks, gas, water, and chemical supression, builders work, testing, commision, handover documentation, liasing with statutory authorities, warranties etc.				
4.29	Existing Fire System - Termination, re-routing, re-alignment, and condemning of existing fire system as deemed necessary.				
	STRUCTURAL STEEL				
4.30	Fire Proofing - Supply and install high quality spray applied cementious fire proofing to all exposed structural steel (In the Plenum). This will be applicable to all relevant fire codes and international building codes (IBC & NFPA).				
	ROOF				
4.31	Roof Works - Supply and install high quality roof extension to the uncovered northern section of the ground floor parking area to the northern property boundary. This will include all roof sheeting, soffit sheeting, flashing, purlins, insulation, fasteners, guttering, downpipes, etc				
4.32	Roof Membrane - Cleaning and removal of all moss, mildew, mold, debris, etc. on roof using approved cleaning chemicals.				
	JOINERY				
4.33	Kitchen Counters - Construction of high quality quartz kitchen counters including cabinets, shelves, counter top etc. This will be inclusive of all materials, fasteners, sealants, hardware, etc.				

NO	DESCRIPTION	QTY	UNIT	RATE	TOTAL
					(VE)
4.34	Vanity - Construction of high quality quartz vanity including counter top to receive sinks. This will be inclusive of all materials, fasteners, sealants, hardware, finishes etc.				
4.35	Skirting, Moulding & Architraves - Supply and install high quality, water resistant timber skirting, moulding and architraves. This will be inclusive of all materials, finishes, fasteners, caulking, sealant, adhesives etc.				
	DOORS				
4.36	Timber Doors - Supply and install high quality solid timber doors with Wilsonart Laminate to both sides / faces as required. This will be inclusive of all finishes, door frame, door closure, hardware, ironmongery, etc. (Single - 36")				
4.37	Shower Enclosures - Supply and install high quality shower enclosures as required. This will be inclusive of all materials, trims, fasteners, adhesives, sealants, hardware, doors, ironmongery etc.				
	GLAZING				
4.38	Glazing - Supply & install high quality safety glass (tempered / laminate) glazing as required. This will be inclusive of all doors, hardware, ironmongery, privacy film, door closures, framing, sealants, fasteners etc.				
	CLADDING				
4.39	Cladding - Supply & install high quality aluminium composite panel (external cladding) as required. This will be inclusive of all materials, framing, hardware, sealants, fasteners, builders work, etc.				
	SIGNAGE				
4.40	Signs - Supply and install internal & external signage as required. This will be inclusive of all materials, electricals, wires, cables, finishes, brackets, supports, fasteners, adhesives, sealants etc.				
	PROTECTION				
4.41	Protection - Protection and reinstatement of all works. This will include repairing, repainting and making good to all affected areas where work was performed (walls, floor, ceiling etc). Finished surfaces must match / replicate surrounding areas.				
	CONSTRUCTION WORKS - SUB TOTAL				
5.00	FURNITURE, FURNISHING & EQUIPMENT				
5.01	Bathroom Accesories - Supply & install high quality soap dispenser, hand dryers, mirrors, hand towel dispensers, bins etc. This will be inclusive of all equipment, fasteners, sealants etc.				
5.02	Office Furniture & Gym Equipment - Supply, install and outfitting of building with necessary office furniture, office equipment, gym equipment, kitchen appliances, and electronics. This will be inclusive of all workstations, chairs, tables, filing cabinets, mobile filing units, exercise equipment, furniture, television, refrigerator, stove, microwave, toaster oven, electric kettle, etc.	1.00	PS	\$ 4,300,000.00	\$ 4,300,000.00
5.03	Manual Blinds - Supply and install high quality roller mesh blinds. This will be inclusive of all materials, hardware, fasteners, accessories etc				
5.04	Artwork - Supply and install high quality framed paintings, brandings, murals, and designer graphix as required. The installed product will satisfy client requirements and specifications, and will be inclusive of all materials, fasteners, supports, brackets, finishes etc.				
	FURNITURE, FURNISHING & EQUIPMENT - SUB TOTAL				
6.00	EXTERNAL WORKS				
6.01	Planter Boxes - Supply and install high quality self watering planter boxes. This will be inclusive of all plants, soil, mulch, fertilizers, equipment, etc.)				
6.02	Electronic Roller Gate - Supply & install electronic roller shutter gate to garage & front entrance. This will inclusive of all equipment, electricals, builders work etc.				
6.03	Carpark - Painting of Carpark Lines & Handicap Parking Signage in Carpark.				
6.04	Interlocking Pavers - Supply and install high quality interlocking pavers to front of building. This will be inclusive of all materials, substructure works, infrastructure works etc.				
6.05	Tank Farm - Construction of tank farm with a minimum of a two (2) day water supply. This will be inclusive of reinforced concrete plinth, pumps, tanks, pipework, fittings, fixtures, commercial water filters, etc.)				
6.06	Generator - Relocation, testing and commisioning of existing generator, inclusive of providing a full tank of fuel and installing a silencer on muffler. This will be inclusive of re-routing all electrical works and construction of new RC Concrete plinth as required.				
6.07	Generator Fuel Tank - Supply and install supplemental (backup) double walled fuel tank for stand by generators with a minimum 4hr supply, and a combined total of 12hrs. This will be inclusive of all equipment, builders work, fasteners, testing, commissioning, liasing with statutory authorities, etc.				
	EXTERNAL WORKS - SUB TOTAL				
			TOTAL (A)	VE	
			VALUE ADDED TAX	12.50%	
			TOTAL (B)	VI	