



Foreign Affairs, Trade and
Development Canada

Affaires étrangères, Commerce
et Développement Canada

Chancery Consolidation Abidjan, Côte d'Ivoire

Project Brief

08/08/2016

Canada

PERFORMANCE SPECIFICATION

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Chancery Consolidation Abidjan, Côte d'Ivoire

Performance Specification

Part 1

General Project Requirements

PART 1 – GENERAL PROJECT REQUIREMENTS

A) GENERAL INFORMATION

1. Project Summary

The Performance Criteria describes the requirements for the design development, working drawings and construction specifications for the new Canadian Embassy in Abidjan, Cote d'Ivoire.

The Government of Canada, through the Department of Foreign Affairs, Trade and Development (DFATD), is consolidating its chancery in Abidjan, Côte d'Ivoire. The chancery located in Abidjan is currently operating out of both the 6th and 7th floors of a 7 storey building. Some of the missions operations have been relocated over the past few years and all embassy staff will suitably function on the 7th floor with minor changes to the existing floor configuration and space.

This project must renovate the existing 743 square meters 7th floor in order to consolidate our operations, fit-up the newly leased 70 square meter space on the ground floor for reception and security screening, replacement of windows on 7th floor and replacement of existing roof materials. The 7th floor renovation work must include: demolition of most existing spaces, provision of new interior finishes throughout, alterations to existing building systems to accommodate new open office workspaces, complete furniture refurbishment and replacement of the mechanical and electrical systems. Refer to Preliminary Plans (Annex "A"). The project will also include minor works on the 6th floor to prepare for divestment.

- 1.1 The new facility must be developed based upon the Concept Plan provided in Annex "C".
 - 1.1.1 The Consultant must be obligated to design the project in accordance with the Cost Plan and assist in cost monitoring throughout the project.
 - 1.1.2 The purposes of the Project Brief are:
 - a) To allow Proponents to prepare and submit detailed proposals;
 - b) To provide sufficient information to allow the Consultant to prepare complete contract documents including: construction documents, cost and Bills of Quantities; and
 - c) To serve as a quality assurance document for the Departmental Representative during the design, construction tender, and construction phase.
 - 1.1.3 The Project Brief describes the minimum acceptable quality standards required for the interior design fit up, special construction of security and communication systems, work stations and furnishings. It may be necessary from time to time during the design stage to amend or supplement the information provided.

2. National Security

2.1 This project involves National Security issues. The Consultant must:

- a) Keep all project documentation secure;
- b) Ensure that project staff do not communicate project related information to any third parties, unless required for completion of the work;
- c) Maintain site security during construction; and
- d) Return all materials and documentation at the end of the project;
- e) All media enquiries must be directed to the Department Representative.
- f) Sign a voluntary Confidentiality Agreement agreeing not to discuss or distribute any general or specific information pertaining to the project to persons not directly involved in the Works.

3. Codes, Regulations, By-Laws

- 1.1 At minimum, the design and construction must conform to all current and applicable laws, codes, regulations and ordinances of local authorities and the most recent edition of Canadian Codes and standards including, but not limited to:
- 1.2 Canada Labour Code, Occupational Safety & Health Regulations;
 - 1.2.1 DFATD Fire Commissioner Requirements;
 - 1.2.2 National Building Code of Canada, (NBC);
 - 1.2.3 Barrier-Free Design, Standard CAN/CSA-B651;
 - 1.2.4 National Fire protection Association Standards (NFPA); and
 - 1.2.5 Any applicable local requirements.
- 1.3 Any other relevant, codes, regulations by-laws and standards as stipulated in the Project Brief
- 3.4 Contact with authorities must be coordinated with the Departmental Representative.
- 3.5 Construction safety regulations of Cote D'Ivoire must be applied on site.

2. Supplied Equipment and Allowances

- 2.1 The following items must supplied by DFATD:
 - 4.1.1 Security and Information Technology Systems as described in Parts 6 and 7 of this Project Brief.
- 2.2 Bullet Resistant (BR) doors, windows and frames;
- 2.3 Door security hardware (i.e. all locksets, handsets, cylinders and electric strikes). Note: all other door hardware including hinges, kick plates, door stops, closers, etc. must be supplied by Contractor.
- 2.4 Furnishings and Fine Art must be procured and installed by DFATD with co-ordination between Consultant and DFATD.

3. DFATD Project Management

- 5.1 A designated Departmental Representative will manage the project. The Departmental Representative is the official point of contact between the Consultant and the Mission.
- 5.2 The Departmental Representative is:

**Mr Tony Sproul,
Project Manager,
ARPA, Capital Project Delivery Division,
Department of Foreign Affairs, Trade and Development Canada,
125 Sussex Drive, Ottawa, Ontario K1A 0G2, Canada**

**Tel.: 343-203-8293
Fax: 613-957-4301
Email:tony.sproul@international.gc.ca**

4. Specialist Consultants

- 6.1. The Consultant must provide for the cost of professionally qualified specialists in his fee including: cost planning, scheduling, fire protection engineer, engineer responsible for all licensing requirements necessitated by the works and activities of this Project Brief including any local requirements for cost planning, scheduling, code consultants, building envelope specialist, audio visual design and health and safety and commissioning. Others may be designated by the Departmental Representative during the course of the Project.

B) PRE- CONSTRUCTION SERVICES**1. Submissions and Reviews**

- 1.1 The Consultant must provide drawings and supporting specifications and reports in French for review and approval by the DFATD Project Team and Fire Authorities.
- 1.2 The complete design must be based on the requirements of this Project Brief. The construction documents must be submitted at the 33%, 66%, 99% and 100% (Final) stages.
- 1.3 Review and acceptance of designs and other documents must proceed as follows:
- 1.3.1 DFATD Project team will review all submissions and provide written comments.
- 1.3.2 The Departmental Representative will return one marked-up set of documents or a written review to the Consultant. The Consultant must provide written response to all comments.
- 1.3.3 Cancelled.
- 1.3.4 During each review period Consultant must maintain full production on the project and revise documents as necessary when review comments are received.
- 1.4 Cancelled.

- 1.5 All plans, specifications and commissioning documents submitted must be in French.
- 1.6 The Consultant must use the same calendar date on all Construction Documents, drawings and specification; this is the date corresponding to the completion of the submission.
- 1.7 The actual list of drawings to be submitted must be determined by the Departmental Representative after discussions with the Consultant.
- 1.8 As-built drawings must be submitted at the end of the Project. All As-Built submissions must bear the seal of the appropriate professional.
- 1.9 Upon final acceptance of Construction Documents provide a hard copy of all reports, design criteria and calculations for mechanical, electrical, civil and structural design to the Departmental Representative in the Formats detailed below. Some of this information may be requested earlier during the design stages or working documents.

2. Submission Format (also applicable to submission of Record Drawings)

Drawings:

1. **Hard Copy:** four (4) bound sets.
2. **AutoCAD Format:** Release 2006 (.DWG) file format.
3. **AutoCAD support files:** including but not limited to drawing files (DWG), external reference (x-ref), shape files (SHX) and font files (SHX, TTF) and color table file (CTB);
4. **Plotting & Layering instructions:** in hard copy (printed instructions) and electronic format (PDF, RTF or TXT);
5. **Media & Quantity:** two (2) complete sets of files copied on CD's or DVD's.

Text documents and Spreadsheets:

6. **Hard Copy:** four (4) bound sets.
7. **Microsoft Word,** latest version.
8. **Microsoft Excel,** latest version.

3. 33% Construction Document Submission

- 3.1. This submission indicates the full-scope of the construction documentation and illustrates the progress in developing the approved design.
- 3.2. Drawings and document list (at this stage, DFATD will provide security input to the hardware schedule; identify location of IT/Data outlets).
- 3.3. Explanatory text on applicable zoning regulations and sequence of activities for reviews by authorities having jurisdiction and processes for obtaining construction permits.
- 3.4. Outline Specification Document.
- 3.5. Provide a first draft of cost report and Bill of Quantities showing labour and material estimates for independent review by DFATD Quantity Surveyors.
- 3.6. Provide full project schedule.
- 3.7. Architectural Drawings: Site Plan, Floor plans, Roof Plan, Exterior Elevations, placement of furniture and built-in millwork, preliminary wall, roof and floor assembly sections indicating

required fire rated and acoustic assemblies, identification of secure wall types, door and room numbers, key interior elevations, sections through plenum spaces, preliminary window/door schedules, preliminary room finish schedules, floor and wall finish drawings.

4. Finish Samples: a sample board of all interior finishes.

4.1 Mechanical

4.1.2 Systems Design Document: For each system provide a description with design criteria and the design intent to meet these criteria and using schematics and diagrammatic layout drawings to fully explain the system, its controls, and its normal and emergency modes of operation, its relationships to all other systems. Throughout project development this document must be refined. The description must include the description of the existing systems that will remain and its proposed modifications. List also the systems that must be completely removed.

4.1.4 Describe provisions to maintain acoustic sound levels.

4.1.5 Establish an energy budget as described below.

4.1.6 Drawings showing preliminary design of all mechanical systems including the sizing of ventilation, duct work, cooling, and fresh air (HRV) showing locations, and all major equipment layouts. Show location of all outdoor air intakes and exhaust.

4.2 Electrical

4.2.1 Drawings, Symbols and Design: Use standard graphical symbols and provide drawings showing advanced development of the following:

4.2.2 Plot plan showing incoming power and telephone service.

4.2.3 Single line diagram of the power circuits with their metering and protection, including: Complete rating of equipment;

4.2.5 Ratios and connections of CT's and PT's;

4.2.6 Description of relays when used;

4.2.7 Maximum short circuit levels on which design is based;

4.2.8 Identification and size of services;

4.2.9 Connected load and estimated maximum demand on each load.

4.2.10 Electrical plans showing:

- a) Floor elevations and room identification;
- b) Legend of all symbols used;
- c) Circuit numbers at outlets and control switching identified;
- d) All conduit and wire sizes except for minimum sizes which should be given in the specifications;
- e) A panel schedule with loadings for each panel;

- f) Telephone conduits system layout for ceiling/floor distribution.
- 4.1.11 Riser diagrams for power, telephone, fire alarm and other systems.
- 4.1.12 Elementary control diagrams for each system.
- 4.1.13 Schedule for motor and controls.
- 4.1.14 Complete lighting layout and fixture schedule clearly indicating methods of supporting fixtures.
- 4.1.15 Distribution diagrams showing single line diagrams to distribution centres.
- 4.1.16 Provide the following data:
 - a) Total connected load;
 - b) Maximum demand and diversity factors;
 - c) Sizing of standby load;
 - d) Short circuit requirements and calculations showing the ratings equipment used.
- 4.1.17 Commissioning submission requirements as outlined in the Commissioning section.
- 4.1.18 All required safety studies as per Cote D'Ivoire Legal Requirements.
- 4.1.19 Any additional drawings or documents required to complete the Basic Design and submit an application for the construction license.

5. 66% Construction Documents Submission

- 5.1. This submission will encompass re-submission of all drawings and documents updated based on DFATD's previous review including:
- 5.2. Comprehensive Bill of Quantities.
- 5.3. Updated Project Schedule by task, trade and priority.
- 5.4. Updated list of drawings and specifications
- 5.5. Comprehensive specification document.
- 5.6. Architectural Drawings: all drawings revised from previous submission plus millwork details, transition details between finishes and washroom details, details for door/window framing, details for all wall sections, and details for roof work. Note: at this stage, DFATD will provide security input to the door hardware schedule, and identify locations for IT/Data receptacles).
- 5.7. All mechanical, electrical and structural drawings and documentation revised from previous submission.
- 5.8. Co-ordination Plans: floors plans that with overlay of all major mechanical, electrical, security and IT infrastructure distribution routes in floors and ceilings in order to identify interferences.
- 5.9. Commissioning submission requirements as outlined in the commissioning section.
- 5.10. Recommended procedure for short listing Contractors. Address quality and financial

capacity.

5.11. Any additional information required for the completion of the construction.

6. 99% Construction Documents Submission

6.1. This submission will encompass re-submission of all drawings and documents updated based on DFATD's previous review including:

6.2. Final Cost Report and Bill of Quantities.

6.3. Final Project Schedule by task, trade and priority.

6.4. Final list of drawings and specifications

6.5. Final specification document including Product Cut Sheets

6.6. Final Architectural Drawings: all drawings revised from previous submission review

6.7. Final Co-ordination Plans: revised from previous submission review.

6.8. Final Commissioning plan

6.9. Final list of contractors for construction bid

6.10. Health and safety requirements as regulated by Canadian and local authorities.

7. 100% Construction Documents Submission

7.1. This submission represents the 100% completed construction documents ready to be issued for construction tender. They must include all revisions required by previous reviews and more than one 100% submission may be required as the documents must be revised to fully address comments.

7.2. The Consultant must sign and seal all architectural and engineering drawings.

7.3. Recommendation and rationale for an appropriate fixed price contract. Provide text file if a standard Côte d'Ivoire contract is recommended. Note: DFATD's preference must use the FIDIC Red Book contract, adding supplementary conditions to suit the fixed price requirements and local construction market.

7.4. Recommendations for the construction documentation:

- a) Contract Security;
- b) Bid Security;
- c) Insurances;
- d) Hold back;
- e) Warranties;

Note: Production of the construction contract and the instructions to bidders must a collaborative process between the Consultant and DFATD. Legal review and translation of these documents must the responsibility of DFATD.

Any additional information required for the completion of the Execution Design and/or to commence the Tender Process.

C) CONSTRUCTION GENERAL

1. Shop Drawings Review

- 1.1. Review Shop Drawings, Product Data, and Samples and provide comments and approval / rejection within 48 hours of receipt to the Construction Contractor and Departmental Representative. Accompany each submission with a Transmittal Letter.
- 1.2. The Consultant and, if required, Construction Contractor's consultant, or other authorized representative, must stamp and sign the submitted materials certifying approval of submissions / professional liability, verification of field measurements and compliance with Contract Documents.

2. Design/Construction Changes

- 2.1. All changes, whether additions or deletions including those not affecting the construction cost, must be covered by Change Orders in order to provide a complete record of variations from the original Construction Documents.

3. Construction Progress Meetings

- 3.1. The Consultant must chair and take minutes of weekly Construction Progress Meetings throughout the duration of the Construction Contract.
- 3.2. Typical Agenda for the Construction Progress Meetings:
 - 3.2.1 Attendance:
 - Contractor;
 - Sub-Contractors (as required);
 - Consultants, Sub-Consultants (as required);
 - Site Supervisor; and
 - DFATD Site Liaison Officer(s)
 - 3.2.2. Location and Time: Record meeting location, date, time, attendance and absences.
 - 3.2.3. Previous Minutes: Review previous minutes.
 - 3.2.4. New Business: Discuss all items of new business and identify parties designated for action.
 - 3.2.5. Construction Schedule: Evaluate progress of work based on the Construction Schedule.

- 3.2.6. Construction Cost/Cash Flow: Monitor Construction Cost Plan and Cash Flow.
- 3.2.7. Shop Drawings: Monitor the progress of shop drawing review.
- 3.2.8. Site Instructions: Record Contractor's acknowledgement of receipt of all site instructions.
- 3.2.9. Changes: Monitor and record the progress of Contemplated Change Notices, quotations, reviews and issue dates of Change Orders.
- 3.2.10. Site conditions: The Consultant is required to record accurately all deviations from the Contract Documents caused by site conditions. The Consultant must review any such cases with the Contractor to determine the effects on project progress and recommend actions.
- 3.2.11. Adjournment and Next Meeting: Record adjournment time, and the date and place of next meeting.
- 3.2.12. Distribution: After approval by the Departmental Representative, the Consultant is responsible for distributing minutes to all Sub-Consultants and Contractors, DFATD Site Liaison Officer(s) plus one copy to the Departmental Representative.

4. Field Review Services (Logs documenting acceptance or rejects and samples)

- 4.1. Review work in progress and materials on site as appropriate to the progress of the work. Use specialists where required. Ensure that Sub-Consultants regularly inspect their portion of the work and provide additional supervision as appropriate.
- 4.2. Maintain shop drawings logs, including date of submission and date of response.
- 4.3. Inspect materials, prefabricated assemblies and components at their source or on site as agreed with the Departmental Representative.
- 4.4. Provide written reports and record the dates of site visits and personnel involved.
- 4.5. The Consultant must respond within 48 hours to resolve questions arising from site conditions, work in progress and materials that may affect the progress and cost of the Project.
- 4.6. Monitor the Contractor's adherence to applicable site safety regulations and advise authorities for inspections as required.
- 4.7. Field review services during construction must include one full time site supervisor (architectural) and one senior engineer for 2 days per week on site.

5. Progress Reports

- 5.1. The Consultant must prepare a written report bi-weekly for the Departmental Representative on the progress of the work to date. The report must include:

- 5.1.1 A description of the progress of construction relative to the schedule (a minimum of ten progress photographs).
- 5.1.2 Potential delays and the recommended action to reduce the impact of the delay.
- 5.1.3 Serious problems anticipated or that have occurred. Including:
- The history of the incident.
 - Action taken to date.
 - Contractor's reaction to the incident.
 - The Consultant's interpretation of the contract requirements relevant to the situation.
 - Recommendations for action which DFATD should initiate.
- 5.1.4 Extra costs in the administration of the construction (actual and anticipated).
- 5.1.5 Measurement of labour and materials for the processing of payments to the Contractor must be completed by the Consultant.

6. Post-Contract Drawings

- 6.1. Prepare additional detail drawings as and when required to properly clarify, interpret or supplement the Construction Documents.
- 6.2. Review these drawings with the Departmental Representative and obtain written approval of Post Contract Drawings prior to their release to the Contractor.

7. Shop Drawings Review

- 7.1. Review shop drawings promptly. Verify that they are clearly detailed and dimensioned, and are not proposing substitution of unacceptable construction or materials. Accept or reject Shop Drawings and return promptly (48 hours) to the Contractor. Send one copy to the Departmental Representative. Provide bi-weekly reports indicating status of shop drawings (date submitted, date reviewed, date returned, etc.)

8. Testing Laboratory Services

- 8.1 Ensure that materials and assemblies are tested as required by the Construction Documents. Require tests of any material and construction on site that appears of doubtful quality or performance.

9. Construction Changes

- 9.1 All changes, whether additions or deletions including those not affecting the construction cost, must be covered by Change Orders in order to provide a complete record of variations from the original Construction Documents.
- 9.2 The cost of changes cannot be included in progress claims until the authorized Change Order has been issued.

10. Contractor's Progress Claims

- 10.1 Progress Payments must be made monthly to the Contractor based on the value of completed work. The value of materials delivered, accepted and adequately protected on the site may be allowed in Progress Payments.
- 10.2 The Consultants Quantity Surveyor and Architect/Engineer must review the claim, make revisions if necessary, and certify value of work done and material delivered, by signing the Cost Breakdown sheet of the claim. Forward the claim to the Departmental Representative for approval.
- 10.3 Payment requires completion and signing, by the parties concerned, of the following documents:
 - Cost Breakdown;
 - Invoice; and
 - Statutory Declaration.
- 10.4 DFATD reserves the right to have any or all claims reviewed by a 3rd party for accuracy and completeness. The Consultant must adjust all claims to meet the requirements of the DFATD Departmental Representative.

11. Interim Inspection

- 11.1 The Inspection and Acceptance Team will inspect the work and list all deficiencies on the standard Inspection and Acceptance form. A complete list of deficiencies must be prepared by the Consultant. DFATD then accepts the Project from the Contractor subject to correction of the listed deficiencies and issues an Interim Certificate of Completion

12. Interim Certificate

- 12.1 As a result of the Interim Inspection and in place of a regular progress claim, DFATD makes payment to the Contractor on the basis of the Interim Certificate of Completion.
- 12.2 Payment requires completion and signing, by the parties concerned, of the following documents:
 - Cost Breakdown;
 - Inspection and Acceptance;
 - Interim Certificate of Completion; and
 - Statutory Declaration.
- 12.3 As a member of the Inspection and Acceptance Team, verify that all deficiencies are correctly recorded, and ensure that Project Record Documents, maintenance manuals, and keys have been submitted by the Contractor, and reviewed and accepted by the Consultant and the Departmental Representative.
- 12.4 Estimate the cost of correcting deficiencies and completing the work, including postponed climate dependent work; enter these costs on the Inspection and Acceptance Certificate.
- 12.5 The Consultant must verify the proper execution of all operation and maintenance agreements by the Contractor.

13. Record Drawings & Manuals

- 13.1 The Consultant must provide DFATD with a full set of Record Drawings, in French, together with the same information on CD's.
- 13.2 The Consultant must instruct the Contractor to record, on one set of white prints, all changes, alterations and additions as covered by authorized "Change Orders". This must also include rerouted lines, relocated ducts, valves and equipment.
- 13.3 Following take-over, obtain marked-up As-Built Documents from the Contractor, showing all changes in construction from the original Construction Documents. Combine this information with all Post-Contract drawings, Change Orders, and other modifications, to produce a full set of Record Drawings on CD's. Drawings must be submitted in PDF and AutoCAD.
- 13.4 Four (4) sets of Operation & Maintenance (O & M) manuals covering all project systems (electrical, mechanical, etc...) must be submitted by the Consultant in French. The Consultant must review and approve the O & M manuals before recommending to the Departmental Representative their acceptance.

14. Final Inspection

- 14.1. Inform the Departmental Representative when satisfied that all work under the Construction Contract has been completed, including the correction of deficiencies listed on the Inspection and Acceptance as a result of the Interim Inspection. The Departmental Representative will make a final inspection of the project.
- 14.2. Accompany and assist the Departmental Representative with the final inspection of the project.

15. Performance Certificate

- 15.1 As a result of the Final Inspection, DFATD makes a final payment to the Contractor on the basis of the Performance Certificate of Completion.
- 15.2 For payment to be made, all parties must complete and sign the following documents:
 - Cost Breakdown;
 - Inspection and Acceptance;
 - Final Certificate of Completion; and
 - Statutory Declaration.

Assemble completed documents and any required supporting documents and submit to the Departmental Representative for processing.

- 15.3 The Consultant must submit to the Departmental Representative a DVD with all the Contractor's correspondence, minutes of meetings, correspondence with authorities, etc.

D) POST CONSTRUCTION SERVICES

1. Warranty Period

1.1 Month Warranty

- 1.1.1 All work under the Construction Contract carries a twelve month warranty commencing on the effective date of the Interim Certificate of Completion. Certain parts of the work may have extended warranties as specified.
- 1.1.2 The Contractor is responsible for correcting all defects in the work during the warranty period, except for damage caused by misuse, abuse or neglect by others including the building occupants.
- 1.1.3 The Consultant must investigate all defects and alleged defects in the work promptly and issue appropriate instructions to the Contractor during the warranty period.

1.2 Ten-Month Warranty Inspection

- 1.2.1 Ten months after take over the Consultant must make arrangements with the Departmental Representative for a ten-month warranty review of the Project;
- 1.2.1 Prepare deficiency lists for the Contractor's correction;
- 1.2.2 Inform DFATD in writing when all items listed on the ten-month Warranty Inspection Certificate have been completed satisfactorily. DFATD then convenes a final inspection of the Project by appropriate personnel.

1.3 Final Warranty Review

- 1.3.1 The Consultant must conduct a final warranty review at the request of the Departmental Representative, before the expiry of the warranty period. Prepare deficiency lists for the Contractor's correction;
- 1.3.2 Inform the Departmental Representative in writing when all deficiencies listed on the final warranty review, deficiency list has been corrected.

Chancery Consolidation Abidjan, Côte d'Ivoire

Performance Specification

Part 2

Architectural and Interior Design

PART 2 – ARCHITECTURAL AND INTERIOR DESIGN

A) CODES, REGULATIONS, BY-LAWS

See: Part 1 – General Project Requirements
A) GENERAL INFORMATION
3. Codes, Regulations, By-Laws

B) PLANNING

1. Appearance and Character

- 1.1 The appearance and character of the chancery space must be similar to the prestige and quality of a class A building in Abidjan. It should be representative of the Embassy of Canada and effectively integrate itself into the appearance and character of the existing building.
- 1.2 Appearance and quality of finished spaces must respond to 3 categories: Enhanced Areas, Office Standard Areas and Service Standard Areas (refer to Annex "A" – Room Data Sheets).
- 1.3 **Enhanced Areas:** for public and representational areas, specifically waiting rooms, MPR, meeting rooms, HOM office and circulation route from entrance to HOM office. These areas must be finished of the highest quality materials and durable for heavy use similar to one would expect in a luxury hotel. These areas are intended to showcase Canada through their use of finishes and installation of fine art (provided by DFATD).
- 1.4 **Office Standard Areas:** for the general office functions of the chancery, specifically workspaces and common office areas. These areas must be finished in a manner consistent with class A office space in Abidjan.
- 1.5 **Service Standard Areas:** for areas in the chancery devoted to the operations of building and security systems specifically electrical and mechanical spaces as well as technical rooms related to chancery security and communications. These areas must be finished in a durable utilitarian manner.

2. Zones and Circulation

The Embassy is comprised of five (5) distinct zones from the point of view of security and control of circulation as follows and partitions, glazing and doors separating the zones from each other have specific requirements. Reference Security Section 6:

- 2.1. **Public-Access Zone:** The area that surrounds or forms part of the Chancery. Examples include the grounds surrounding a building, and public corridors/elevator lobbies in multiple-occupancy buildings.
- 2.2. **Reception Zone:** The areas accessible to the general public and Chancery staff with minimal restriction during normal hours of operation. This includes areas such as waiting room, screening areas and MPR areas. Access to these areas is supervised by locally engaged guards and receptionists.

- 2.3. **Operations Zone:** The area accessible to Canadian and locally engaged staff working at the embassy. This **includes** workspaces and common office areas. Access from the reception zone to the operations zone is controlled by the receptionist through secure IDACS controlled doors.
- 2.4. **Secure Zone:** The area accessible only to Canadian employees. This includes workspaces and common office areas. Access from the operations zone to the secure zone is managed through IDACS controlled doors.
- 2.5. **High Secure Zone:** The area containing classified activities and accessible only to specific Canadian individuals. Fit-up of these areas is done by DFATD managed resources.

3. Building Systems: General

- 3.1. Standards and materials stipulated indicate the minimum acceptable.
- 3.2. All security related material and components must be approved by DFATD.
- 3.3. All building systems must be designed utilizing a conservative interpretation of relevant codes, particularly where considering the potential of natural forces such as earthquakes, floods, tornadoes, typhoons.
- 3.4. All systems must be designed on the basis of providing safety to personnel during operation and maintenance; ease of maintenance of equipment; and operational economy.
- 3.5. Existing building systems to be re-used must be protected during construction including by not limited to base building systems, ceiling suspension systems, interior door, glazing systems and fixtures and fittings.

C) EXTERIOR

1. General Building Envelope:

Any upgrades to the building envelop must visually match the existing exterior and be designed and specific to carry a life span of 25 years without major interventions.

- 1.1 **Sound Control:** exterior noise levels must be assessed in order to determine required acoustic levels for windows and exterior walls.
- 1.2 **Moisture Control:** all penetrations, curbs for roof equipment, parapets, eaves, window and door heads must be flashed in a manner that provides a continuous membrane and moisture barrier that directs water away from building envelop.
- 1.3 **Heat Control:** all exterior walls and roofs must maintain continuous thermal barrier and be designed in a manner that provides minimal thermal bridging. Level of thermal resistance must be determined by local codes.
- 1.4 **Vapor and Air Control:** all exterior walls and roofs must maintain a continuous vapor and air barrier made from materials purposely made for this and with suitable sealants between different elements. Location of vapor and air barriers within roof and wall assemblies must respond to local climate.

2. Exterior Walls

- 2.1 **Existing Cladding:** any replacement of existing cladding materials must match existing.
- 2.2 **Existing Windows:** replacement of 7th floor windows must visually match windows of other floors and include double or triple glazing as required to meet acoustic requirements and reduce heat gain. For single glazing not less than 6.8mm laminated glass should be used. In double glazed units (DGU) the inner pane should not be less than 6.8mm laminated glass and the outer pane should be a minimum of 6mm toughened or 6.8mm laminated glass.
- 2.3 **Flashing:** new flashing must be provided around all wall penetrations.

3. Roof Upgrades

- 3.1 **Life Span:** all new roofing materials must have satisfactory performance for a period of 25 years without major repairs. Preferences must be given to roof assemblies with proven records of long life and low maintenance in the local area.
- 3.2 **Design and Installation:** roof system must be designed using industry accepted specifications and methods. Installation must only be done by trained and experience crews and tested by certified roof specialist. Sufficient roof drains must be installed to properly drain the most severe 100 year rain fall.
- 3.3 **Thermal Movement:** roof design and co-ordination of materials must allow for ambient temperature of 110C without causing buckling, failure of joints and seals or stress on fasteners. Details for roof penetrations must reflect this.
- 3.4 **Protection:** provide adequate protection to roofing materials to resist degradation related to ultra-violet radiation, up-lift forces, foot and vehicle traffic and roof equipment.
- 3.5 **Anchoring:** anchoring of equipment and window cleaning rigging must be concealed or integrally bonded into the roof assembly, presenting no external penetrations of the weather proof membrane. Roof pavers may be used provided they are vented on the underside, are interlocked and have sufficient mass to resist uplift forces.
- 3.6 **Roof Equipment:** existing supports for roof mounted equipment must be replaced with concrete curbs integrated into roof structure. And, any penthouse structures must be re-clad. Any equipment visible from street must be set back from roof edge to minimize visibility from street and in a manner that can be easily maintained.
- 3.7 **Slope:** roof slope must be min 2% or steeper as required by roof product specifications.

D) INTERIORS

1. General

- 1.1 The quality of the interior chancery space must be equivalent to class A office space in Abidjan and be designed in a manner that incorporates a cohesive interior scheme throughout. There are three categories of spaces in the chancery: Enhanced Areas, Standard Office Areas and Service Standard Areas. Refer to Annex "A" - Room Data Sheets to determine which spaces fall into which category.

- 1.2 The layout of chancery spaces must be arranged as shown in the Concept Plan prepared by DFATD (see Annex "C"). Interior offices must include glazing to allow transmission of natural daylight.
- 1.3 All moveable furniture and furnishings must be supplied by DFATD and interfacing systems such as power and communications must be coordinated between Consultant and Contractor.
- 1.4 An interior finish and color scheme with sample board must be prepared by the Consultant and submitted for approval by DFATD at 33% submission. This scheme will encompass all interior surfaces including the ceiling system, walls, floors, baseboards, millwork, doors, hardware, lighting, washroom fixtures. DFATD will work closely with the Consultant on the coordination between moveable furniture, materials, colors and building systems.
- 1.5 All built-in millwork design is the responsibility of the Consultant and fabrication/installation by the Contractor. Finishes must include cultured stone counter tops, with under-mount stainless steel sinks and wood laminate cupboards and coordinated with DFATD approvals.

2. Interior Doors

- 2.1 Doors for enclosed offices and other common areas (meeting rooms, quiet rooms, etc.) may be wood veneer, glass or steel and must be coordinated with the overall interior scheme.
- 2.2 Door Frames: refer to Part 6 - Physical Security
- 2.3 Door Hardware: refer to Part 6 - Physical Security
- 2.4 Doors supplied by DFATD must be coordinated with Consultant and Contractor as it relates to finishes of interior scheme, preparation of framed openings and fire ratings required by local code.

3. Floors (Refer to Annex "A"- Room Data Sheets)

- 3.1 Floor finishes must be coordinated with interior scheme, approved by DFATD and specified in accordance with the category of room indicated in Annex "A" - Room Data Sheets. Quality of finishes are:
 - 3.1.1 **Enhanced Areas:** must be provided with high quality durable hard finish material such as wood or stone.
 - 3.1.2 **Standard Office Areas:** must be provided with high quality durable hard finish material such as porcelain, ceramic or polished concrete tile.
 - 3.1.3 **Service Standard Areas:** must polished, sealed concrete, linoleum or static-dissipating vinyl.
- 3.2 Washrooms, kitchens and service areas must be provided with appropriate high traffic, non-slip hard surface resistant to moisture. Acceptable materials include non-porous hard surfaces such as commercial grade ceramic tile, quarry tile and/or other similar natural or man-made products such as commercial grade vinyl tile or linoleum.

- 3.3 The location and finish of cover plates for floor access panels having voice / data / power or pedestals must be coordinated with the floor finishes and DFATD furniture plan.

4. Ceilings (Refer to Annex "A"- Room Data Sheets)

- 4.1 Ceiling finishes must be coordinated with interior scheme, approved by DFATD and specified in accordance with the category of room indicated in Annex "A" - Room Data Sheets.
- 4.2 Quality of finishes are:
- 4.1.1. **Enhanced Areas:** may be a mix of fixed hard surface ceiling finishes and coordinated accessible panels or ceiling tiles.
- 4.1.2. **Standard Office Areas:** must have a uniform drop ceiling height to provide flexibility for future floor plan changes. Enclosed spaces should have the same drop ceiling height as adjacent open office spaces. Exposed ceilings may also be considered.
- 4.1.3. **Service Standard Areas:** Service Standard areas must be exposed ceiling or accessible drop ceiling.
- 4.3 An integrated drop ceiling must have visual consistency and incorporate all ceiling mounted devices including luminaries, access panels, sprinkler heads, fire protection and security devices.
- 4.4 All ceiling areas used for horizontal system distribution should be accessible without requiring repair to interior finishes.

5. Partitions

- 5.1 Partitions finishes must be coordinated with interior scheme, approved by DFATD and specified in accordance with the category of room indicated in Annex "A" - Room Data Sheets.
- 5.2 For partitions required to be security barriers, assembly and construction details must be consistent with wall types indicated in Part 6 - Physical Security. Any glazing in Type 3 partitions (physically resistant) must have a polycarbonate film laminated between two layers of glass meeting criteria referred to in Part 6 - Physical Security. Any openings in partitions to receive bullet resistant glazing units from DFATD must be coordinated with DFATD bullet resistant window schedule.
- 5.3 Interior partitions not required to be security barriers may be glazed with tempered glass or finished with gypsum board on minimum 90mm depth metal stud with cable enclosure for electrical and IT/DATA distribution.
- 5.4 Partition assemblies, glazing inserts, and their connections to ceilings and floors must meet required sound transmission coefficient ratings as specified in Annex "A" - Room Data Sheets.

6. Light Reflectance

6.1 General light reflectance on finished surfaces and materials must be as follows:

Ceilings	80%
Walls	40% to 60%
Floors	30%
Windows	40% to 60%

7. Conveying Systems:

7.1 Not applicable for this project.

E) BUILDING SPECIALTIES

1. Window Washing Equipment:

1.1 Not applicable for this project

2. Waste and Recycling:

2.1 Provisions for removal of waste and recyclables must be coordinated with local practices and any on-site containers must be planned accordingly, including within built-in millwork.

3. Drinking Fountains

3.1 Drinking Fountain or Water Cooler must be accessible from public waiting area.

4. Window Coverings

4.1 Consultant must specify manually adjustable window coverings throughout considering ease of operation, sun angle, internal temperatures, cleaning, privacy requirements, maintenance, repair and replacement. Coverings must visually match coverings on other floors.

4.2 For general office areas, 3-5% transmittance factor is required. For Enhanced Areas, a combination of black-out transmittance, sheers and lined curtains is required.

5. Signage

5.1 All required statutory, illuminated exit and other signs, must be specified by the Consultant and be provided by the general Contractor to meet local code requirements. Where possible, use pictograms rather than text (i.e. running man to illustrate exit). Where text is required, all signage must be at a minimum in French and English.

5.2 All non-statutory signage consisting of exterior and interior signs must be designed and specified by the Consultant as indicated in Annex "B" - Mission Signage Standard. The design must be submitted for approval to DFATD before fabrication and installation. Signage in the public areas must be in French and English.

5.3 All interior signage must be of a quality and material specific to the category of the space and cohesive to the interior scheme.

6. Flagpoles

6.1 Not applicable for this project

Chancery Consolidation Abidjan, Côte d'Ivoire

Performance Specification

Part 3

Structural Engineering

PART 3 - STRUCTURAL ENGINEERING

A) APPLICABLE CODES AND STANDARDS

1. Building Code Compliance Requirements

- 1.1 All new structural systems designed and installed must meet all applicable codes, standards and regulations of the authority having jurisdiction or the National Building Code of Canada 2010 (NBCC 2010), whichever is more stringent.
- 1.2 For a complete description of the code compliance requirements refer to:
Part 1 – General Project Requirements
A) GENERAL INFORMATION
3. Codes, Regulations, By-Laws

2. Design, Evaluation And Performance Of Structure

2.1 Structural Loads

2.1.1 General Considerations

- a) Determine the capacity of structural members to withstand, within acceptable deflection limitations, all current and planned occupancy loads. Provide the most efficient and cost effective solutions for any structural reinforcing, if required.
- b) Verify that floor slabs, horizontal framing members, and beams or girders have the required capacity to carry the loads resulting from the proposed layout. Uniformly distributed live load must not be modified by reduction factors. In the calculation of live loads on columns or structural walls, no reduction factor for tributary area must be applied to the uniformly distributed live load.
- c) All verified general design load capacities must be clearly specified within the “General Notes” on the drawings. Any locations where design load capacity exceeds that of the general load capacity must be clearly identified on the drawings.

2.1.2 Office Space – Floor loading Review

- a) Structural verification of the structural framing is required for all floor areas supporting storage and filing rooms, mobile shelving units, and computer rooms. Minimum superimposed live load capacity must be:
 - Storage Areas and Server Rooms: live load 4.8 kPa
 - Mobile shelving units: live load 7.2 kPa
 - High Security Zone (HSZ): live load 7.2 kPa

2.1.3 Hardened Walls

- a) Verify existing slab to carry the increased weight of hardened walls, 4.0 kPa multiplied by the height of the wall where indicated in the architectural drawings.

2.2 Floor Penetrations

- 2.2.1 Floor penetrations, if required, must be designed so as to **NOT** decrease the capacity of the Lateral Force Resistance System (LFRS).
- 2.2.2 All new openings for installation of mechanical, electrical, communication systems, etc. must be reviewed by the structural engineer, and approved in writing. Cutting or coring of openings must **NOT** decrease the live load capacity of the slab or any other structural element

B) SUBMISSIONS

1. Construction Document Phase

1.1 Deliverables

- 1.1.1 Construction drawings and specifications as required for any modification to the existing structure to accommodate the new floor openings and local higher loads;
- 1.1.2 Written confirmation signed and sealed by a Professional Structural Engineer, that the floor does have the capacity to carry the superimposed live load specified in item 2.1.2.1, and the additional security walls as specified under item 2.1.3.1.
- 1.1.3 Slab reinforcing details (if required for increased load capacity).
- 1.1.4 Review & written acceptance of floor penetrations for new mechanical, electrical and communication systems, or recommendation of alternate locations.

Chancery Consolidation Abidjan, Côte d'Ivoire

Performance Specification

Part 4

Mechanical System Requirements

PART 4 - MECHANICAL SYSTEM REQUIREMENTS

A) GENERAL

1. Introduction

- 1.1 The mechanical section identifies the design requirements and criteria for the new mechanical systems for the 7th floor and the ground floor space. Changes must be made to the ventilation and air conditioning system as well as to the plumbing and fire protection system.
- 1.2 The systems must be designed specifically for the loads associated with the usage of this space.
- 1.3 The design must take into account local practices in order to facilitate long-term maintenance and ease of use. The specified products and equipment must be available locally.

2. Scope of Work

- 2.1 The project consists of designing new mechanical systems for the 7th floor and the ground floor space, including ventilation, air conditioning and plumbing, taking into account the new space layout. A new outdoor air intake system must be installed. For specific existing systems at the embassy, a review is needed to determine what work must be done to separate the 7th floor from the 6th and 4th floors. The new installations must be durable and meet requirements to provide acceptable air quality for the occupants.
- 2.2 Provide a complete design for the changes to the following systems:
 - 2.2.1 Domestic water supply
 - 2.2.2 Sewage drainage
 - 2.2.3 Fire protection system (fire hose station and portable extinguishers)
 - 2.2.4 Dilution ventilation and air conditioning
 - 2.2.5 Ventilation control
 - 2.2.6 System start-up, verifications, adjustments, balancing and performance checks
 - 2.2.7 Administration (construction drawings including installation details, shop drawing reviews, as-built drawings, work site instructions, etc.)
 - 2.2.8 Certificate of completion and performance certificate
 - 2.2.9 Operation and maintenance manuals
- 2.3 The drawings and load calculations must be certified by an engineer. The consultant is responsible for coordinating the various disciplines such as architecture, electrical and the multiple mechanical systems.

3. Specifications

- 3.1 The equipment and material specifications must include a description of the material, the performance required, installation characteristics and details regarding the quality of work required.

4. Training Manual

- 4.1 The operating and maintenance manual must include as-built drawings, technical data sheets, model number, list of system parts, replacement options, description of the operation of each system, operating sequence, results of tests and power-on self-tests, system balancing, maintenance schedule (including description of tasks), and warranties.
- 4.2 The manual must be provided in both electronic and paper format, in duplicate, in both French and English.

5. Spare parts

- 5.1 The consultant must include a list of spare parts within the specification that the Contractor must responsible to provide at the end of the project. For each system installed and in addition to the final operating set, provide a new spare set of filters for all air handling units, water filter and any other spare parts that are routinely changed as part of the maintenance program that may cause an interruption in operations if not readily available.

6. Analysis of Existing Systems

- 6.1 The information regarding the existing systems must be validated in order to define the project requirements. Some systems, such as the plumbing stack, water treatment and fire hose stations, can be part of the basic building or can be installed solely in the spaces occupied by the Canadian embassy.
- 6.2 Confirm the condition of the plumbing stack for the domestic water supply and the work needed to separate the 7th floor from the other floors while maintaining water supply to the 6th and 4th floors.
- 6.3 Confirm whether the water distribution for the fire hose stations is for the entire building, and confirm its condition.
- 6.4 Confirm the compliance and quality of the plumbing installation (water supply, drainage and ventilation).
- 6.5 For the components that are part of the building's basic system, the general condition and quality of the installation must be checked so that the necessary improvements can be made if necessary. At minimum, maintenance should be completed.
- 6.6 Check the condition and estimate the serviceable life of the air conditioning split units used on the 7th floor. As a general rule, they will not be reused unless they are still in good condition, have a minimum remaining service life of 5 years, and their capacity meets requirements.

- 6.7 Following inspection of the existing systems, a condition report must be provided. This report must include photos to support the observations made so that the Department representative can make informed decisions.

7. Ground Rules

- 7.1 The mechanical systems must be simple, reliable, durable and flexible and be energy efficient.
- 7.2 The mechanical designer must coordinate the systems in relation with the space and provide access panels needed for conducting maintenance. Install equipment at an acceptable distance from building structures to allow for the maintenance, removal and replacement of mechanical systems.
- 7.3 The mechanical systems must be coordinated with the other disciplines and must be integrated with the architectural design in order to maintain the desired aesthetic look.
- 7.4 All equipment must have a means of cutting off the power supply nearby. For health and safety reasons, this switch must be in view of the equipment. There must be coordination with the electrical section with regard to sizing, locating, indicator lights, etc.
- 7.5 For all new equipment, the commercial products provided must be of high quality and manufactured by internationally recognized companies. All devices and accessories must be produced by the same manufacturer.
- 7.6 The new installations must comply with the most recent codes unless this is impossible when connecting to existing systems. In such a case, the appropriate authorities and the Department's representative must be consulted to resolve the conflict.
- 7.7 Over the years, space modifications may be necessary. The design for the new systems must allow for future system adjustments, e.g. adding piping, extending an air conduit.
- 7.8 Provide the necessary information to the appropriate authorities to obtain construction permits, licenses and compliance certificates. You must contact the authorities for the inspections and assume all costs associated with these inspections.
- 7.9 If welding services are required, the work must be completed by a certified welder. Building management must be informed when the work must take place.
- 7.10 All equipment must be clearly identified, e.g. domestic cold water.

8. Performance Criteria

- 8.1 The mechanical systems must be designed to meet the operational needs of each space. As part of the design, implementation and start-up phases, the following basic criteria must be met:
- 8.1.1 Occupant safety;
 - 8.1.2 Occupant comfort;
 - 8.1.3 Air quality;
 - 8.1.4 Reliability;
 - 8.1.5 Simple operation and maintenance; and
 - 8.1.6 Energy efficiency and a good cost-efficiency ratio.

8.2 The materials and equipment installed by DFATD must be of superior quality and commercial grade. The useful lifespan, with regular and proper maintenance, should be:

- 8.2.1 Air conditioning split system – 20 years
- 8.2.2 Fan coil units – 15 to 20 years
- 8.2.3 Sanitary facilities – 35 to 40 years

9. Compliance with Codes, Standards and Guidelines

9.1 The installations must comply with the most recent codes listed below. This list includes the main codes, standards and guidelines.

9.2 All mechanical systems must be designed to comply with the applicable codes and standards and with the regulations set forth by the proper authorities. The most stringent of the codes must be applied.

9.3 The mechanical design must comply with the standard ANSI/ASHRAE/IESNA90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings.

9.4 Canadian Publications

- 8.1.1 CAN/CSA B52-13, Mechanical Refrigeration Code
- 8.1.2 Treasury Board Secretariat of Canada Occupational Health and Safety Manual
- 8.1.3 National Fire Code of Canada - 2010
- 8.1.4 National Plumbing Code of Canada 2010
- 8.1.5 National Building Code of Canada 2010
- 8.1.6 Guidelines for Canadian Drinking Water Quality 2014

9.5 United States Publications

- 8.5.1 ASHRAE: Handbook fundamentals, Handbook of HVAC applications, Handbook of HVAC and Equipment, and Handbook of refrigeration.
- 8.5.2 ASHRAE: Standard 55: Thermal Environmental Conditions for Human Occupancy
- 8.5.3 ASHRAE: Standard 62-2010: Ventilation for Acceptable Indoor Air Quality
- 8.5.4 ASHRAE: Standard 90.1-2010: Energy Standard for Buildings Except Low-Rise Residential Buildings

B) LOCATION OF THE MECHANICAL COMPONENTS AND SPECIFIC ACCOMMODATIONS

1. Mechanical Rooms

1.1 All mechanical system components must be installed so that they can be accessed for maintenance and repairs. It must also be possible to remove all sub-components without damaging anything.

1.2 Access doors must be installed for the distribution and ventilation systems. Access ways are needed for maintaining the coils and filters.

1.3 The equipment must be installed and located to avoid the transmission of noise and vibration throughout the rest of the building.

2. Specific Accommodations

2.1 High-occupancy Zones

- 2.1.1 High-occupancy zones such as the MPR/meeting room, waiting room should be ventilated using an independent system. A variable-volume system could be considered in order to reduce costs.

2.2 Mail Processing Room

- 2.2.1 This room should have a lower pressure in relation to the adjacent room. The air from this room should be vented outside directly.

2.3 Mechanical Room

- 2.3.1 The DCC, MSR/IDACS/Registry rooms must be air conditioned 24/7. The interior units (evaporators) can be installed above the door so as not to interfere with the equipment.

2.4 Ground Floor Zone

- 2.4.1 The ground floor zone must be air conditioned and have an outside air intake. The opening of windows does not count as an air intake.

3. Noise and Vibration Transmission

- 3.1 The vibration isolators must be 99% efficient for the rotating equipment to prevent vibrations from being transmitted to the building's structure, walls and floors.
- 3.2 Control the noise generated by the air in the ducts and the ceiling cavity. This can be done by controlling the velocity and/or installing duct silencers.

4. Insulation of the Ventilation Ducts

- 4.1 All ventilation ducts must be insulated. The insulating materials must be installed only on the outside of the duct.

5. Thermal Insulation of Piping

- 5.1 All piping that transports liquids at a temperature other than the ambient temperature must be thermally insulated. If the temperature of the liquid is lower than the dew point, the thermal insulation must be covered with a vapour barrier to prevent condensation on the surface of the piping.

Thermal insulation installed outdoors must be covered in aluminum to protect it from UV rays.

6. Seismic Protection

- 6.1 All equipment must be secured laterally and vertically so that it is supported in the event of an earthquake. Refer to [Part 3 Structural Engineering](#) for the level of restriction and applicable codes and standards.

- 6.2 All main equipment such as the ventilation unit, reservoirs, pumps, condenser, evaporators, etc. must be operational following an earthquake.

7. Plumbing System

7.1 Scope of Work

- 7.1.1 Review the plumbing distribution for the 7th floor and determine the condition of the piping. If the piping is not in good condition and does not comply with the installation criteria above, replacement should be considered.
- 7.1.2 The domestic water supply comes from a dedicated line to our space, supplying the 4th, 6th and 7th floors. This plumbing stack is in bad condition and must be replaced. The 4th and 6th floors must be supplied from the building's basic source. The new plumbing stack must be copper, including the connectors, (joints, couplers, elbows, etc.) and the piping must be installed with lead-free welds. Galvanized and PVC (polyvinyl chloride) piping will not be permitted for the new installations.
- 7.1.3 Replacement must be coordinated so as to maintain water supply and keep service interruptions short.
- 7.1.4 In the new floor configuration, certain water points have been eliminated. During removal, the piping must be removed as close as possible to the main line. Insofar as it is possible water and drainage pipes must not be abandoned in place.
- 7.1.5 For the new toilet and coffee station, if the distance does not allow for the necessary drainage slope, a pumping station must.
- 7.1.6 For each kitchenette, lunchroom and coffee station, there must be hot water available. The temperature in the hot water tanks must be a minimum of 60°C to prevent Legionnaire's disease.
- 7.1.7 Each plumbing fixture must have one or more isolation valves to cut off the water locally if needed.
- 7.1.8 The plumbing fixtures must comply with most recent CSA standards or European standards.
- 7.1.9 All piping must be properly identified.

7.2 Sewage Drainage

- 7.2.1 The new installations requiring drainage must be vented. Automatic air vent systems are not acceptable.
- 7.2.2 Drainage piping must be made of cast iron or copper.
- 7.2.3 The existing drainage is made of PVC. If the PVC used does comply with standards DIN 4102-1 Class A (A1 or A2) or Class B (B1), the existing piping must be covered with insulation that has a one-hour fire resistance rating.

7.3 Plumbing Fixtures

- 7.3.1 Provide plumbing fixtures that comply with applicable codes and standards.
- 7.3.2 The fixtures must be of high quality, be designed for commercial use and be manufactured by recognized companies.

8. Ventilation and Air Conditioning

8.1 Calculation of Cooling Loads

- 8.1.1 A cooling load calculation must be prepared and supported by engineering calculations and then submitted to the Department representative for revision and placed in the record. The cooling load calculation and the energy analysis must be performed using simulation software that uses the latest version of the ASHRAE Handbook of Fundamentals developed for an hourly analysis of the cooling load for commercial buildings.
- 8.1.2 The software must be capable of calculating the maximum load for each zone as well as the total load for the building. At minimum, this must include the solar gains from the windows, the internal gains from lighting and equipment, and the gains from the outdoor air (sensible and latent) from ventilation and infiltration.
- 8.1.3 The software must use current one-hour data. The report must be submitted at the design stage.
- 8.1.4 Gains from lighting and equipment should be based on current loads, but for estimating purposes, the calculations can be based on the following data:
 - a) 20W/m² for receptacles
 - b) 15W/m² for lighting

8.2 Internal Design Criteria

- 8.2.1 The design must comply with the data from the three following tables:

Table 1: Interior Temperature

Parameter	Occupied Mode	Unoccupied Mode	Measurement Height
Cooling mode	24°C	No cooling	Waist height
Telecommunications room	22°C maximum		

Table 2: Relative Humidity

Parameter	Relative Humidity
During summer (cooling mode)	50% ± 5%
Telecommunications room	40% ± 15%

Table 3: Other Criteria

Parameter	Value
Minimum rate of outdoor air	10 l/s per person for the office spaces and for particular cases see <u>Annex "A" - Room Data Sheets</u> .
Air velocity	Minimum 0.10 m/s Maximum 0.25 m/s
Filtration of outdoor air	MERV 8 pre-filtration (30 to 35% effectiveness) Maximum particle size: 10 microns
	MERV 13 final filtration (80 to 90% effectiveness) Maximum particle size: 1 micron
	Carbon dioxide

8.3 Thermal Comfort – Temperature and Humidity

- 8.3.1 The designer must select a type of system that is common, simple to use and easy to maintain. A ventilation unit must be installed in order to have an outdoor air intake. The unit must be capable of achieving 4 air changes per hour or 10 l/s per person (whichever is greater).
- 8.3.2 An extraction system is necessary in the kitchenettes, bathrooms and cleaning closet and the business centre.
- 8.3.3 If the ventilation unit is not 100% outside air and representation spaces are on the same system, the air in the representation spaces must be evacuated without returning to the unit.
- 8.3.4 Provide digital thermostats for each zone. Closed offices must have their own thermostats.
- 8.3.5 Spaces with variable occupation (meeting room, MPR, waiting room) must have a variable air intake controlled by a CO₂ sensor.
- 8.3.6 The air intake must be 10% higher than the extraction to maintain a positive pressure inside the building.

8.4 Special-purpose Rooms

- 8.4.1 The space has a few special-purpose rooms for which the cooling needs and operations are different. These are rooms DCC, MSR/IDACS/Registry.

- 8.4.2 Independent air conditioning is required for 24/7 operation. Each unit must have its own thermostat to maintain the temperature and relative humidity in accordance with the design criteria, i.e. 22°C with a relative humidity of 40% ± 15%.
- 8.4.3 Heat gain due to the equipment must be calculated allowing for transmission due to the building envelope, solar gain, lighting and occupants.
- 8.4.4 The air conditioners must be air-cooled units, using a refrigerant that complies with environmental standards (410 or 407A) with a performance coefficient of 3.5 or ERR of 16 or better.
- 8.4.5 The condenser must have a joint-less copper coil with copper blades. The condenser coil must be treated with an anticorrosion agent such as heresite.
- 8.4.6 The unit must restart automatically following a power outage.

8.5 Indoor Air Quality

- 8.5.1 To ensure proper air quality, the ventilation must distribute clean air, without odour and free of contaminants, in sufficient quantity throughout the space to dilute contaminants and odours and provide sufficient oxygen to the occupants.
- 8.5.2 The air must be distributed so as to cover all the occupied spaces. The minimum air rate must be maintained throughout the occupancy period.
- 8.5.3 The location of the air intake is critical to air quality and the health of the occupants. The location must be selected to avoid exterior contaminants such as vehicle exhaust, sewage extraction and other extractions that could pose a risk.

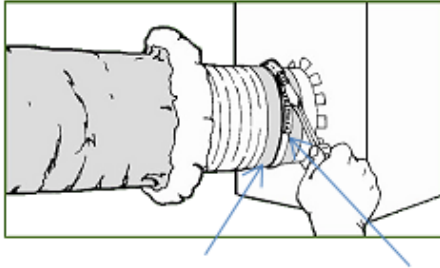
8.6 Air Extraction

- 8.6.1 Extraction from the washrooms must be independent from the other extraction needs and the washrooms must have lower pressure than the adjacent rooms.
- 8.6.2 Design for the following extraction volumes:
 - a) Washrooms: 25 l/s per plumbing fixture
 - b) Business centre (printer and photocopier): 2.5 l/s per m²
 - c) Kitchenette and coffee station: 1.5 l/s per m²
 - d) Public space (including the visitor side of the interview room): All air intakes must be extracted. The public spaces must have a lower pressure in relation with the work zone.
 - e) There must be air circulation at the demarcation point.

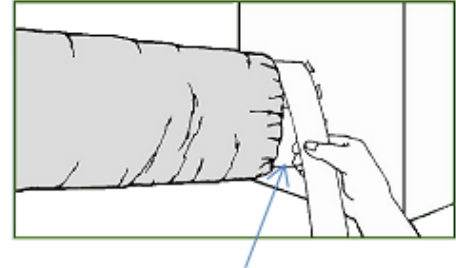
8.7 Installation Criteria

- 8.7.1 The ventilation ducts must be made of metal, with sealed seams to prevent air losses and insulated on the outside. Internal insulation is not acceptable.

- 8.7.2 Flexible ducts are acceptable for connecting the diffusers and the return and/or extraction grids. The maximum length must not exceed 1.5 m. The flexible ducts must not go through walls.

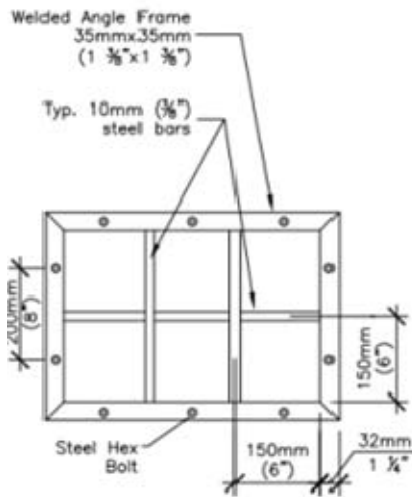


2 wrap of duct tape clamp connection

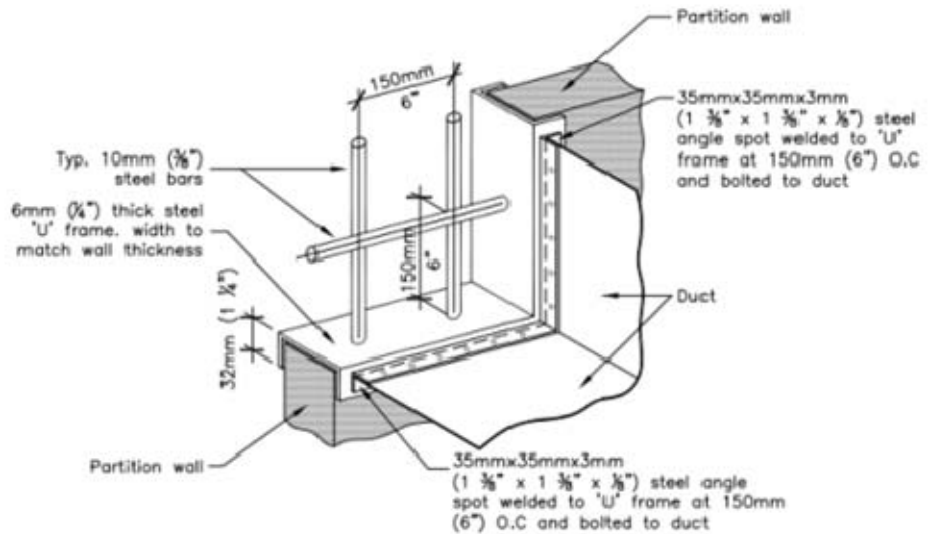


2 wrap of duct tape

- 8.7.3 The connectors for equipment with a motor, or rotating components, must be made with flexible 150-mm couplings.
- 8.7.4 Provide sleeves for all ducts that go through floors or walls.
- 8.7.5 Provide dielectric joints in areas where incompatible metals are connected.
- 8.7.6 Provide supports for the ventilation ducts and piping. Walls cannot take the place of supports.
- 8.7.7 The ventilation unit should be modular.
- 8.7.8 Any duct exceeding 600 cm² crossing through a secured wall must have a security grid where it crosses the wall.



1 FRONT ELEVATION AT
A8 TYP. DUCT GRILLE



2 ISOMETRIC VIEW DETAIL AT TYPICAL DUCT GRILLE
A8

Balancing dampers must be installed on each ventilation duct connection and on each diffuser.

8.8 Firewall Shutters

8.8.1 Install firewall shutters in ducts exiting a mechanical room, in ducts crossing through floors if they are not enclosed in a firewall separation, at the exit of fire-resistant mechanical hoppers and crossing any fire-resistant wall.

8.8.2 Firewall shutters must have a minimum resistance rating of 90 minutes.

9. Controls

9.1 The controls for the units must be simple and easy to adjust. It must be possible for local Contractors to adjust and check the controls.

9.2 If a variable refrigerant system is selected for the air conditioning, a leak detection system must be installed.

10. Start-up, Verifications, Adjustments and Balancing

10.1 Start-up

10.1.1 A manufacturer's representative must be present when the equipment is started up.

10.1.2 All controls and components must be adjusted to comply with the design values.

10.1.3 Submit a start-up report.

10.2 Verifications, Adjustments and Balancing

- 10.2.1 In the project development stage, provide a methodology for the verifications, adjustments and balancing in accordance with the recommended systems. This must be done for the ventilation and air condition systems (aeraulic and hydraulic), plumbing and all controls.
- 10.2.2 This methodology must be part of the specifications for the Contractor's tasks.
- 10.2.3 Audit reports must be submitted to the Department representative.
- 10.2.4 The designer is responsible for ensuring that the systems are properly installed and operate correctly.

11. Replacement Parts

- 11.1 Once the project is completed, the items listed below must be handed to the Department representative:
 - 11.1.1 Replacement filters for the ventilation system; and
 - 11.1.2 A set of water treatment filters (if a new system is installed).
 - 11.1.3 Replacement belt for the ventilation system including extraction if applicable.
 - 11.1.4 Control system components that may have delivery time delay.

Chancery Consolidation Abidjan, Côte d'Ivoire

Performance Specification

Part 5

Electrical System Requirements

PART 5 - ELECTRICAL SYSTEM REQUIREMENTS

A) GENERAL

This section defines the mandatory criteria to be used in the design, planning and modification of the electrical and fire protection system for the 7th floor of the chancery. Provisions must be made for flexibility from the beginning of the design of the electrical power systems to enable modifications to be easily made. The lighting and electrical power systems must have sufficient capacity to adapt to future increases in point loading and allow for modifications to be made without resulting in major inconveniences to the rest of the 7th floor.

The project consists of providing a new design for the electrical systems on the 7th floor and space on the ground floor including the electrical distribution, lighting and fire protection, taking into account the new layout for the space. For the existing specific systems at the embassy, there must be a review to determine what work is needed to separate the 7th floor from the 6th and 4th floors. The new installations must be durable and fulfil requirements to provide a service life of more than 25 years.

As far as is reasonable and practical, the renovation projects must meet the standards set out in this section. All equipment and materials on the 7th floor must be demolished and replaced with new systems designed to meet the current and future usage needs of the facility. The replacement materials and work must comply with the requirements below.

The commercial products provided must be of high quality and manufactured by internationally recognized companies. All equipment provided must be pre-authorized by the Department representative before acquisition and installation.

1. Installation Standards

1.1 Electrical systems must meet or exceed the requirements of the following codes, standards and guidelines. In case of conflict the most stringent requirement must apply:

- a) Electrical installation standard NF C14 100 and C 15 100 C 60364;
- b) NBN S21-100, Conception des installations de détection d'incendie [Design of fire protection installations];
- c) CAN/CSA-C22.1, Canadian Electrical Code, first part, 2015;
- d) Standards of the Canadian Standards Association (CSA) or equivalent (UL, ULC, EC or CE);
- e) CAN/ULC-S524-06: Installation of Fire Alarm Systems;
- f) CAN/ULC-C537: Verification of Fire Alarm Systems;
- g) Treasury Board Fire Protection Standard, Chapter 3.4: Standard Fire Alarm Systems;
- h) National Building Code of Canada (NBCC) 2010 and its supplements;
- i) National Fire Code of Canada (NFCC).
- j) ASHRAE 90.1, Energy Standard for Buildings;
- k) Model National Energy Code of Canada for Buildings;
- l) Illuminating Engineering Society of North America (IESNA);
- m) Lighting Guide 7: Office Lighting, from the Chartered Institution of Building Services Engineers (CIBSE);
- n) *Canada Labour Code* – Part IV

2. Scope of Work

- 2.1 The systems for power supply, lighting and the installation of raceways for IM-IT as well as the other elements of the 7th floor must be designed to integrate together and thereby produce a work area that complies with the requirements of the program corresponding to the commitment of the Department of Foreign Affairs, Trade and Development (DFATD) in terms of durability and energy efficiency.
- 2.2 The existing systems on the 7th floor must all be removed and disposed of as stipulated. With regard to the installations on the ground floor, the current state and durability of the existing electrical distribution must be validated.
- 2.3 The new electrical systems, equipment and material must be based on an analysis of the life cycle costs of the systems that will have a service life of at least 25 years.
- 2.4 The power supply and electrical distribution system must allow for a future growth of at least 25% of the systems without material upgrades. It must allow for the addition of new elements, such as circuit breakers and conduits, by providing a 20% backup capacity and an extension of bus bars for all distribution panels.
- 2.5 Provide access panels and appropriate openings for maintenance. Provide sufficient clearances for equipment removal. Make distribution junction boxes accessible at all times and provide portable mechanical lock devices to isolate equipment.

3. Maintenance Manual and Spare parts

- 3.1 The operating and maintenance manual must include as-built drawings, technical data sheets, model number, description of the operation of each system, operating sequence, results of tests and power-on self-tests, distribution balancing, system ground measurements, maintenance schedule (including description of tasks), and warranties.
- 3.2 The manual must be provided in both electronic and paper format, in duplicate, in both French and English.
- 3.3 The consultant must include a list of spare parts within the specification that will be pre-approved by the Departmental Representative. The Contractor will be responsible to provide these spare parts at the end of the project. For each electrical system installed, in addition to the parts installed at the time of possession, the Contractor shall provide an assortment of spare parts for each electrical systems such as, but not limited to; the lighting infrastructure, power distribution, controls and any other spare parts that are routinely changed as part of the maintenance program that may cause an interruption in operations if not readily available.

4. Seismic and Critical Infrastructure Protection

- 4.1 All primary equipment, including but not limited to light fixtures, must be provided with seismic restraints. Electrical infrastructure and cable trays must remain fully operational during and after earthquakes.
- 4.2 Provide shock mounts for equipment suspended from the ceiling slab. The restrainers must by no means compromise the effect of the equipment's anti-vibration dampers. The

equipment and its restrainers must satisfy the more stringent quality and design requirements of the local and the Canadian codes and standards for protection from seismic loads.

- 4.3 Provide seismic restraints on internal light fixtures and cable trays to protect personnel and the facility from falling objects. With t-bar ceilings, independent chain anchors for light fixtures must be required to reduce the effect of a collapsed ceiling.

5. Low Voltage Distribution

- 5.1 A power supply meter must be provided to record the chancery's internal usage on the 7th floor as well as for the power supply to the ground floor space.
- 5.2 The new low-voltage distribution for the 7th floor must be isolated from the rest of the building and be powered by a new feeder from the building's electrical distribution system.
- 5.3 The existing generator transfer switch must also be connected solely to the 7th floor's electrical systems and the ground floor space currently occupied by the Canadian mission.
- 5.4 The additional electrical loads must be determined independently in accordance with the following load groups: outlet loads of 30 VA/m², lighting loads of 20VA/m², motor loads, the hot water tanks and the ventilation/air condition equipment (VAC) in accordance with the data plate to be installed.
- 5.5 The electrical engineer must submit an evaluation of the existing installations to ensure that the existing low tension feeder can accommodate the additional electrical loads.
- 5.6 Minimum interrupting capacity for any circuit breakers and any other electrical device must not be less than 10,000 A.
- 5.7 The secondary power supply for the 7th floor and the office space on the ground floor must be distributed as follows:
- 5.7.1 Normal power for common and convenience outlets, indoor lighting, mechanical equipment and motor control centres;
 - 5.7.2 Continuous uninterruptible power supply for electrical equipment, workstation outlets, television screens, telecommunication panels and other special-purpose rooms as defined below. This power supply must be provided with separate distribution panels and connected to the central inverter.
- 5.8 The inverter providing the continuous uninterruptible power supply must be equipped with a bypass switch in order to isolate the inverter during maintenance work.
- 5.9 The continuous uninterruptible power supply must have a central battery bank with a minimum 15-minute capacity to ensure the proper shutdown of the computer systems in case of an emergency generator failure. The commercial products for the inverter must be of high quality and manufactured by internationally recognized companies.
- 5.10 The inverter's minimum capacity must be the total calculated based on:
- a) A load of 250 watts per workspace; plus

- b) A load of 1000 watts for the TC; plus
- c) A load of 1000 watts for the DP; plus
- d) A load of 1500 watts for the MSR.

- 5.11 The Consultant must provide the load calculations for the inverter as well as the technical sheet for the equipment for the Department representative's approval.
- 5.12 Each distribution panel must be 3-phased and have copper bus bars. A central distribution must distribute the power on the floor where it is located from designated electrical room, including the inverter providing the uninterruptable power supply, the automatic transfer switch and the distribution panels. The electricity consultant must make sure that all the electrical equipment can be installed in this room.
- 5.13 Provide a transient voltage suppressor each electrical panel, providing a minimum protection of 40 kA and complying with the requirements of a Type 2 installation and the IEEE C62.41 testing standards.

6. Raceways

- 6.1 The raceway system must consist of a cable tray network connecting the distribution panels and the equipment which are located in the suspended ceiling and under the raised floors within the corridors of the 7th floor or other raceways such as but not limited to electrical metallic tubing (EMT) conduits. **Non-metallic raceways are only acceptable if they achieve or exceed the flame spread rating in the applicable standards.**
- 6.2 Communications raceways must have a clearance of 150 mm from the power supply raceways to reduce the risk of EMF interference.
- 6.3 Install the raceways parallel or perpendicular to building lines.
- 6.4 Independent raceways are required for normal and normal/emergency (N/E) power, the security system and the telecommunications horizontal pathways. The telecommunications pathway (metallic conduit and cable tray) must serve all telecommunications needs, including voice and data.
- 6.5 Usage of a single cable tray for multiple services requires the express approval of the Department representative.
- 6.6 The preferred locations for the electrical, telecommunication and security horizontal distribution networks are either under the raised floor or in the ceiling cavity above the hallway.
- 6.7 The contractor must coordinate the installation of the cable tray with plumbing and HVAC so that a minimum clearance of 200 mm is provided on each side of the cable tray.
- 6.8 Provide the manufacturer's standard materials: clamps, hangers, brackets, splice and reducer plate's barriers, connectors and grounding straps as required.
- 6.9 All empty conduit systems must be provided with nylon pull-cords of adequate strength and must have plastic bushings at each end of the conduit.
- 6.10 All raceways (conduit and/or cable tray) must be provided with a separate ground/bonding

- conductor having a minimal size of 6 mm².
- 6.11 The ground/bonding conductors must be run back to the panel and connected on the provided grounding bus.
- 6.12 The use of incombustible flexible shielded conduits or flexible shielded cables must be limited to the final connections to the equipment, such as motors, lighting, devices, etc. The use of flexible cables/conduits must not exceed 3 m on each connection unless approval to the contrary is given by the Department representative.
- 6.13 For motors and equipment subject to vibrations or movement, provide flexible connection of liquid-tight flexible metal conduits.
- 6.14 Suitable clearances must be maintained to avoid conductor exposure to excessive heat.

7. Wires and Cables

- 7.1 Power feeders must have a neutral with capacity equal to full charge.. Common neutral wire is not acceptable for branch wiring.
- 7.2 Branch conductors must be made of copper and have a minimum size of 2.5 mm². They must be resistant to a nominal temperature of 90°C and be insulated for a voltage of 0.6/1 kV. Use of 1.5 mm² conductors are not allowed unless approved by the Department representative.
- 7.3 Feeders and branch circuit conductors/cables must consist of copper conductors in a conduit or multi-conductor cable in a cable tray. Multi-conductor cables installed in an open cable tray must have a flame spread rating equal or greater than the EN 50226 standard. Critical equipment must be powered by a cable with 1-hour fire resistance rating.

8. Branching and Outlets

- 8.1 Convenience or “housekeeping” outlets must be installed every 5 m along the walls.
- 8.2 Provide specialized outlets (separate duplex outlets) powered by their own circuit breaker for specialized equipment such as the photocopier and printers installed in the work areas.
- 8.3 The circuit breakers must be at least 16 A for all normal branching, provided that the outlets have an electrical capacity equal to 16 A.
- 8.4 There must be no more than 4 workstations per 16 A branch.
- 8.5 Each workstation must equipped with 2 duplex outlets and 2 USB outlets connected to the uninterruptible power supply.



- 8.6 The business centre spaces must be equipped with 3 outlets with a 16 A capacity connected to three independent circuit breakers.
- 8.7 In the kitchen, each 16 A outlet must be connected to a 16 A overload protector. A minimum of 6 circuits must be assigned to the kitchen (refrigerator, microwave, kettle, dishwasher, and multiple-use counter outlets).
- 8.8 All outlets located within 1500 mm of the centre of the sink must be connected to a 30 mA circuit breaker.
- 8.9 An additional outlet must be installed on one of the kitchenette walls for multiple use.
- 8.10 The installation of outlets for televisions must be coordinated with the installation of the audiovisual services.
- 8.11 In the DCC, two lockable 20 A outlets and one lockable 30 A outlet must be installed under the plywood panel. In addition, three 16 A outlets, each connected to a 16 A circuit breaker, must be installed under the same panel.
- 8.12 The location of the outlets for the work areas must be coordinated between the DFATD architect and interior decorators.

9. Identification

- 9.1 The raceways, outlet and circuit breaker plates as well as the control devices must be identified, including the name of the electrical panel and circuit number. All equipment must be identified using permanent name plates, label maker and/or 150 mm colour coded band. The distribution panel must include a complete written circuit directory.
- 9.2 The raceways and junction boxes must be labelled in accordance with the table below:

<u>Systems</u>	<u>Primary Colour // Secondary Colour</u>
Fire alarm	Red
Normal power supply	Yellow
UPS	Yellow//Red
Grounding and bonding	Green
Information Technology/Management IT/IM	Orange
VSAT	Orange // Black
Internet	Orange // Yellow
Security	Blue
IDACS/SSEC	Blue // Yellow
CSAS	Blue // Black
Closed circuit cameras	Blue // Green

10. Lighting

- 10.1 Consideration must be given to the options offered by direct lighting, indirect lighting, direct/indirect lighting and lighting from wall or floor-mounted fixtures.
- 10.2 For the calculations, a depreciation coefficient of 0.7 must be used, with reflection coefficients of 8/5/3.

- 10.3 The overall building lighting power density using the base building area method must meet or exceed the requirement of NF 16001 but never exceed an overall power density of 11.5 W/m².
- 10.4 Flexible task lighting and furniture with built-in lighting, although not part of these specifications, are an integral part of the lighting design and should be included. The two systems will ensure that the lighting meets the recommended lighting quality and lux level at the working surface.
- 10.5 Indoor illumination levels must be as follows for each area:
- | | |
|------------------------------|-------------------------------|
| Entrance | 325 lux |
| Waiting area | 325 lux |
| Visitor orientation areas | 150 lux |
| Washrooms | 220 lux |
| Hallways | 220 lux |
| Traffic areas | 220 lux |
| Workstations | 500 lux |
| Conference and meeting rooms | 0 to 500 lux (fully dimmable) |
| Kitchen(s) | 500 lux |
| Library | 500 lux |
| DCC, IDACS & MSR rooms | 500 lux |
| Telephone closet and DP | 500 lux |
| Multi-purpose rooms | 0 to 500 lux (fully dimmable) |
| Storage rooms | 325 lux |
- 10.6 New lighting must be the most efficient type for practical use and always be of high-quality commercial design. Offices and other areas using personal computers or other VDT systems should use direct/indirect or ceiling fixtures with low-glare lenses compliant with NBN EN 12464.

11. Lighting Control

- 11.1 The lighting control system must have the same topology as the existing control system.
- 11.2 Feeder protection circuit breakers are not to be used as a switch.

12. Evacuation, Security and Night Lighting

- 12.1 Provide evacuation lighting by means of a self-contained emergency lighting (SCEL) that is chosen to be complementary to the areas in which it must be installed. Provide SCEL for the technical areas, hallways, stairwell, multipurpose room and public areas. SCEL must provide an average light intensity of 10 lux without ever being below 1 lux.
- 12.2 The SCEL must have a self-diagnostic printed circuit board (self-test).
- 12.3 Ten percent of office light fixtures (night lights) must remain permanently on to provide a low level of night lighting in the embassy for security purposes.
- 12.4 Security lighting must be type ISO 3864-1 and ISO 7010 exit signs. All exit signs must be the same type throughout the building and be complementary to the areas in which they are installed.

13. Grounding

- 13.1 A new grounding cable for the IT and telecommunications system must be installed in the DCC. The conductor, which must have a minimum size of 70 mm², must be connected to the grounding system of the building's electrical system. The routing of the grounding network must be as follows: building's existing grounding bar to the MSR and the DCC. The grounding conductor must be installed in a metallic electrical conduit with the required termination caps.
- 13.2 The grounding conductor will terminate on a copper bus bar, installed under the plywood for the IM equipment.
- 13.3 A conductor that is 16 mm² with a length of 2400 mm must be provided in order to connect the communications equipment.

14. Designated Computer Centre (DCC) Room

- 14.1 When the computer centre services are relocated from room 630 to the DCC, the Contractor must provide a new electrical infrastructure, including the grounding system.
- 14.2 The estimated design load for the equipment in the DCC room, excluding air conditioning and lighting, is 7 kW.
- 14.3 Standard office light fixtures with a lighting level of 500 lux must be provided in this room.
- 14.4 Power for lighting and HVAC will come from the normal power infrastructure.
- 14.5 From the inverter power panel, provide four 16 A circuits supplying four double outlets (one per circuit), one on each wall in the room, mounted 400 mm above the finished floor. One of these outlets must be positioned next to the voice/data outlet located in the room.
- 14.6 Install one DFATD-supplied 30 A twist lock receptacles (L6-30R) protected by a 25 A single pole breaker with North American boxes and covers. This receptacle must be powered by a 25 A power circuit connected to the generator.
- 14.7 Install two DFATD-supplied 20 A single twist lock receptacles (L6-20R) with North American boxes and covers. Each outlet must be protected by a 16 A single pole breaker and be connected to the generator.
- 14.8 The twist lock receptacles must be grouped together (one 30 A and two 20 A) on one side of the plywood backboard in the room.

15. Fire Alarm/Detection System

- 15.1 A wireless fire alarm/detection system will not be accepted for this installation.
- 15.2 After confirmation that a fire alarm system is required in accordance with local authorities and the Department's fire protection coordinator, the following information must be provided in order to establish an acceptable equipment level for the fire alarm system.

- 15.3 The design and installation of the fire alarm system components must comply with the standards stipulated in the NFPA 72 and CAN/ULC-S524 codes.
- 15.4 Devices must meet or exceed standards BS, EN, 54, NFPA 72 or CAN/ULC-S524.
- 15.5 The system must include heat and smoke detectors, audible and visual devices, entrance and exit devices with a circuit breaker isolator and break glass box. All of these must comply with the EN-54 standard or equivalent on the 7th floor as well as in the spaces described in paragraph 6.15.7.
- 15.6 The main control panel for the fire alarm/detection system must be located in the embassy's operational zone and connected to the building's central fire detection panel. The system must come with a self-contained unit with a self-sufficiency of 24 hours.
- 15.7 Smoke detectors must be installed in the following areas of the building:
- 15.7.1 On the ceiling of every third landing of each stairwell;
 - 15.7.2 All public spaces such as the entrance, elevator lobby and bathroom.
- 15.8 Break glass boxes must be installed in the following areas:
- 15.8.1 Each exit on each floor leading to the stairwell;
 - 15.8.2 Each exit on the ground floor.
- 15.9 The audible and visual signal devices must be installed below the level of the suspended ceilings on permanent interior walls, and not on the moveable partitions. A certain quantity of audible devices must be provided so that each room in the building has a minimum audible pressure of 65 dB.
- 15.10 The cabling used for the fire alarm must meet or exceed the test method for cables under fire conditions set out in standards IEC 60332603321, DIN VDE 0266 and DIN 4102, part 12, and have a fire-resistance rating of ≥ 1 hour. The fire alarm system must be in either a metal conduit, with a minimum inside diameter of 19 mm or be composed of a fire rated cable complete with a metal armour or sheath installed in a cable tray. All fire alarm cabling installed within 0 to 2500 mm of the finished floor must be installed in a metal conduit regardless of the composition of the fire alarm cable.
- 15.11 The design and installation of the fire alarm system must be consistent with the recommendations of the builder's Canadian Code consultant, subject to the approval of the DFATD's fire protection coordinator.
- 15.12 The "F" type doors must have magnetic door locks connected to the fire alarm panel's auxiliary relay in order to close the fire doors in the east side hallway.



- 15.13 System verification must be in accordance with the CAN/ULCS537 Standard for the Verification of Fire Alarm Systems in the presence of the Department representative.
- 15.14 The Contractor must be responsible for providing a cable connected to a contact that is normally off inside the alarm panel of the MSR. A length of 3000 mm of cable must be left on top of the security control panel.

Chancery Consolidation Abidjan, Côte d'Ivoire

Performance Specification

Part 6

Physical Security

PART 6 - PHYSICAL SECURITY

A) GENERAL

Security should be an inherent and discrete part of the design. The High Commission space must protect employees, property, and sensitive materials from threats of violence, and espionage penetration. Physical security barriers and check points are required throughout the High Commission. Controlled access to the space must be provided for all pedestrians.

Points of entry and reception points should be minimized and allow for natural supervision and/or monitoring of movement and entry. There should be minimal isolated vistas and dead end spaces to design out potential for crime. There should be provision for appropriate security lighting that does not seem overbearingly bright but provides a more secure and protective environment.

Glossary and Acronyms

IDACS	Intrusion detections and Access Control System
CESS	Chancery Electronic Security System
BR	Bullet and Physically Resistant Material
CSAS	Chancery Security Alert System
CCTV	Closed Circuit Television
OZ	Operations Zone
SZ	Secure Zone
HZ	High Secure Zone

1. Bullet and Physically Resistant Material – Glazing

- 1.1 DFATD representatives must liaise with the architect and provide direction regarding the application of bullet resistant and physically resistant glazing material. Generally, bullet resistant glazing is required where staff and public exchanges/transactions occur in a hardened wall between the Reception Zone and Operational Zone. Typical locations are the reception wickets in waiting areas as well as the interview rooms provided to enable staff to meet privately with members of the public.
- 1.2 DFATD will provide all BR glazing material for the installation by the Contractor based on fully detailed and approved drawings promulgated by the builder. The Contractor must provide roughed-in openings for security elements to dimensions provided on the approved detailed drawings.

For technical requirements for Interview Booth BR Glazing see:

Part 6 – Physical Security

B) BULLET RESISTANT WINDOWS

2. Bullet and Physically Resistant Material – Walls

- 2.1 Hardened walls separating the Operations zone and the Public Zone or the Secure Zone and the High Security Zone are bullet and physically resistant (*Type 1 – Masonry Wall: Bullet Resistant* or *Type 2 –Composite Wall: Bullet Resistant*).
- 2.2 The decision on whether to use Type 1 or Type 2 walls is based on whether the floor slab can handle the additional weight of a *Type 1 – Masonry Wall: Bullet Resistant*. If the floor

slab cannot handle the weight of a *Type 1 – Masonry Wall: Bullet Resistant*, a *Type 2 – Composite Wall: Bullet Resistant* will be required.

- 2.3 Rough location, type and size of all barrier walls must be identified by DFATD after review of concept design. DFATD must liaise with the architect to develop and finalize barrier wall types and locations. Detailed drawings with appropriate sections must then be submitted to DFATD for approval and to ensure the framing and component structure follow Departmental norms.
- 2.4 The Contractor must source all material and construct all security walls as per DFATD security requirements.

For technical requirements on type 1, type 2 and type 3 walls see:
Part 6 – Physical Security
C) WALL TYPES

3. Doors

- 3.1 The Contractor must provide and install all interior and exterior doors based on a DFATD approved door schedule. DFATD will provide pre-configured access control doors complete with all associated hardware.
- 3.2 Doors being provided by the Contractor should be flush, solid-core wood doors. Matching-edge veneers should be provided for transparent-finished wood doors. All Chancery interior wood doors must be solid core wood, a minimum of 45 mm thick capable of accepting North American, mortised, door hardware.
- 3.3 A vault door and day gate must be installed/relocated in the High Secure Zone. Vault doors and Day Gates are supplied by DFATD and each vault door and Day Gate comes complete with its own frame and hardware, the Contractor must supply a rough reinforcing frame firmly anchored to the upper and lower slabs. The rough opening is 1000 mm wide and 2064 mm high. The door weight is 363 kg.

For technical requirements see:
Part 6 – Physical Security
D) DFATD SUPPLIED ACCESS CONTROL DOORS AND DOORS AND
FRAMES; *and*
E) VAULT DOOR AND DAY GATE

4. Door Hardware

- 4.1 The Contractor must supply and install door finish hardware, hinges, kick plates, door stops, weather stripping and all cabinet-type hardware for locally procured doors.
- 4.2 DFATD provided doors will come equipped with all required door hardware.
- 4.3 DFATD will liaise with the Architect and Contractor to review and approve door and door hardware schedules. DFATD will also provide guidance to the Builder, Architect or Contractor on the application, preparation and installation of DFATD approved, North American door hardware.

- 4.4 Approved door hardware must be of North American manufacture and consistent with DFATD standards. In general, mortise lock sets must be selected for all interior doors. Where narrow style metal doors are involved, "Adams Rite" mortise locks (with "Medeco" cylinders) must be used. Locking panic hardware must be compatible with "Medeco" rim or mortise type cylinders.
- 4.5 DFATD must supply, pin, code and install all permanent key cylinders after take-over, replacing temporary cylinders used during construction.

5. DFATD Supplied Services and Items

- 5.1 The following items must be supplied by DFATD (with user's manuals where applicable). Installation of these items must be Contractor's obligation:
- Lock-sets, closers, panic hardware, electric strikes, (cabinetry, hinges, kick plates and door stops to be supplied by the Contractor)
 - BR doors complete with frames and all related door hardware
 - BR windows complete with frames
 - Pass-through trays for use in wickets/interview booths

B) BULLET RESISTANT WINDOWS

Figure 1.2.4-9 Pass-Through Tray Installation Detail

Figure 1.2.4-10 Reinforcing for Interview Window and Counter

Figure 1.2.4-11 Interview Window and Counter: Attack Side Elevation

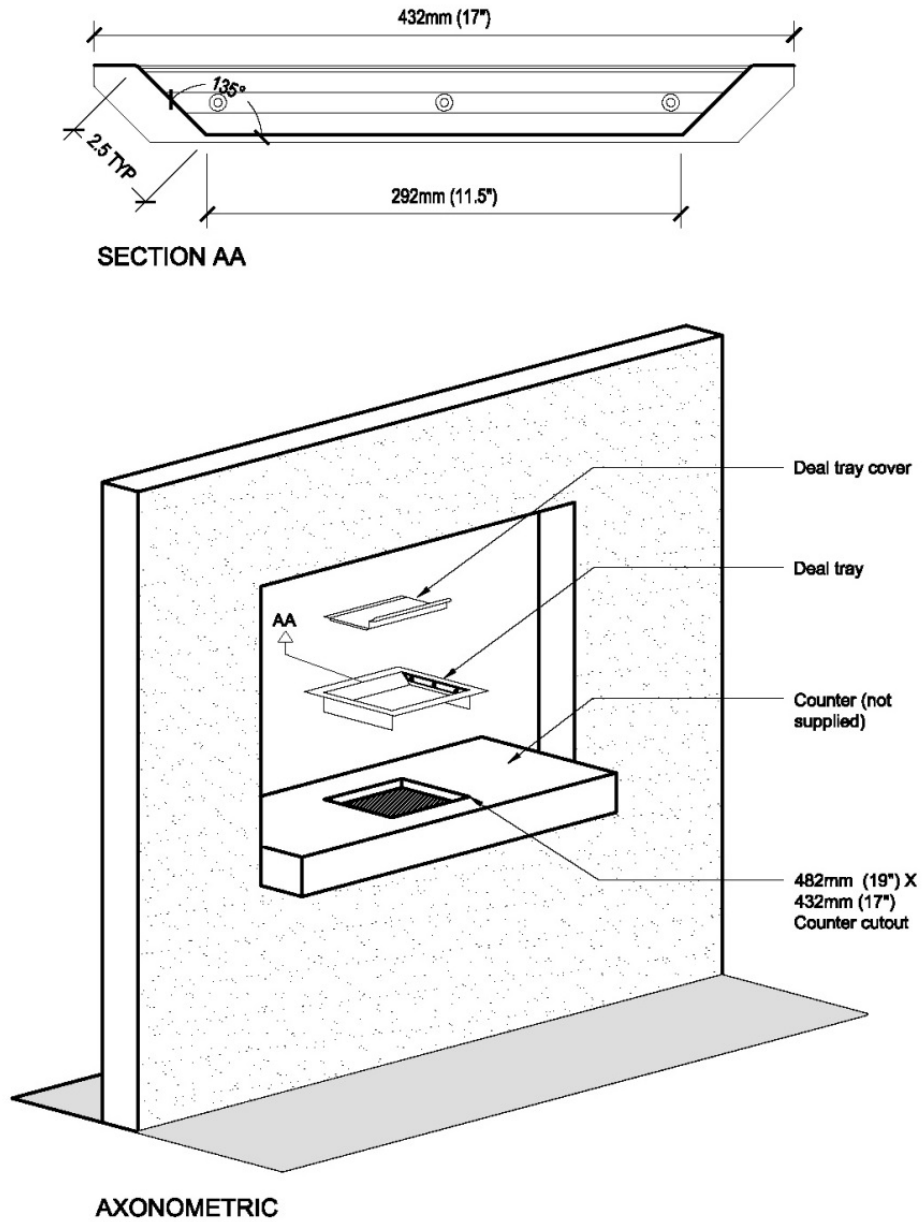
Figure 1.2.4-12 Interview Window and Counter: Secure Side Elevation

Figure 1.2.4-13 Seated Interview Window and Counter: Vertical Section

1. Structural Reinforcing Requirements

- 1.1 Due to the significant weight and the attack resistance of the bullet resistant windows it is necessary to structurally reinforce framed walls to receive these windows.
- 1.2 The Contractor must be responsible for constructing a structural frame which will support the bullet resistant interview window and counter. **Figure 1.2.4-10** details the frame construction for a typical building. Refer to **Figure 1.2.4-10** for interview window and counter. Any deviation from these accepted designs must be approved by DFATD prior to construction.
- 1.3 The structural frame must be constructed from C75x9 (C3x6) steel "C" channel and must be constructed as per the reference drawings depending on the type of window to be installed. The assembly must be electrically welded with the flat side of the channel facing to the inside of the opening. The vertical members must extend from floor to ceiling and must be securely fastened to the floor while including a 25mm deflection gap at the underside of the slab above. The fasteners must be tack welded to ensure they do not become loose over time. Once assembled the framework must provide a rough opening to receive the window. Window dimensions are ultimately based upon site specific and architectural requirements, it is the Contractor's responsibility to ensure the rough opening will accommodate the windows specified.

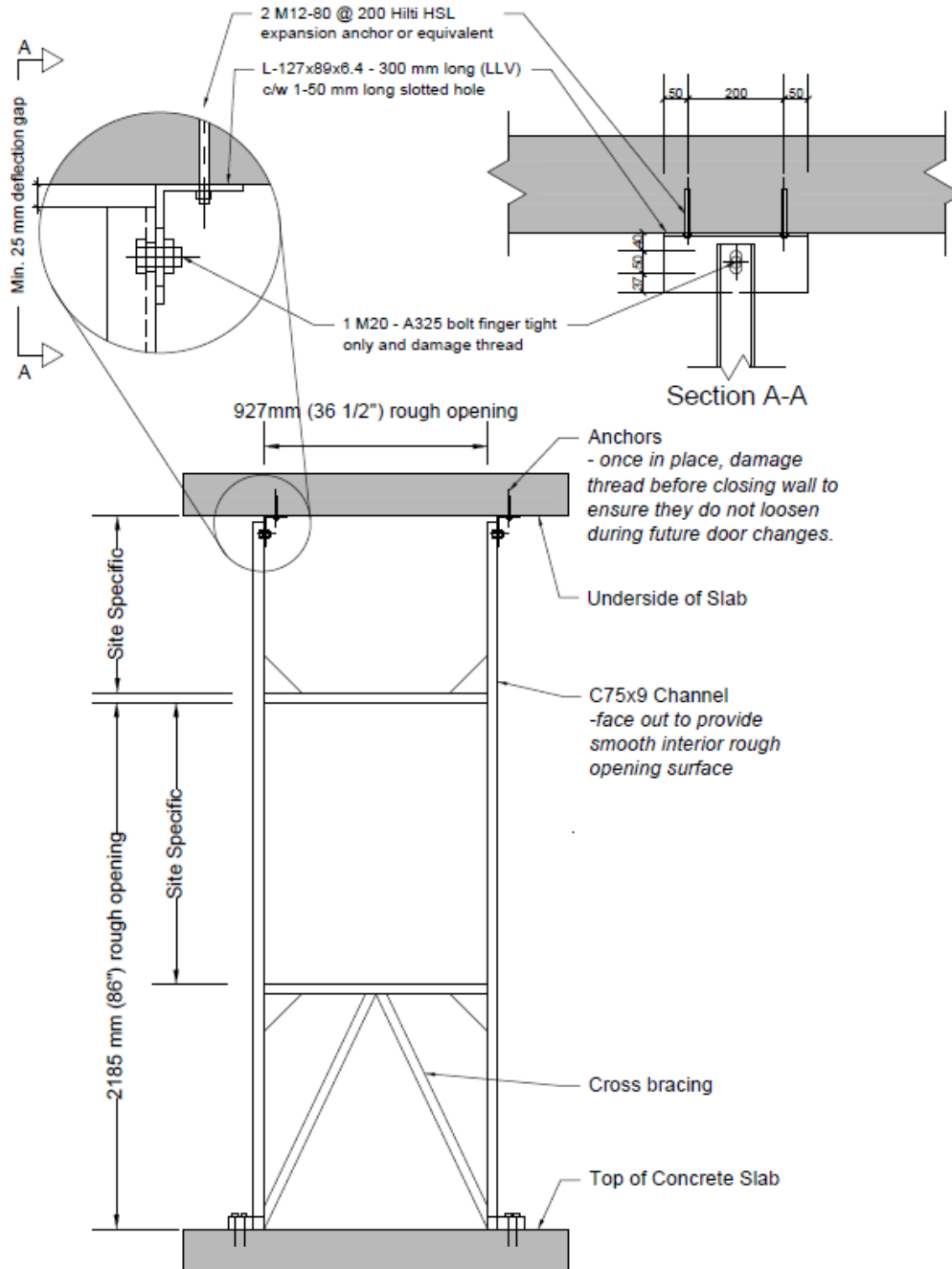
Figure 1.2.4-9 | Pass-Through Tray Installation Detail



NOTES

1. Deal tray is to be set into cutout and affixed with adhesive or sealant.
2. sliding deal tray cover shall be placed into position as shown.

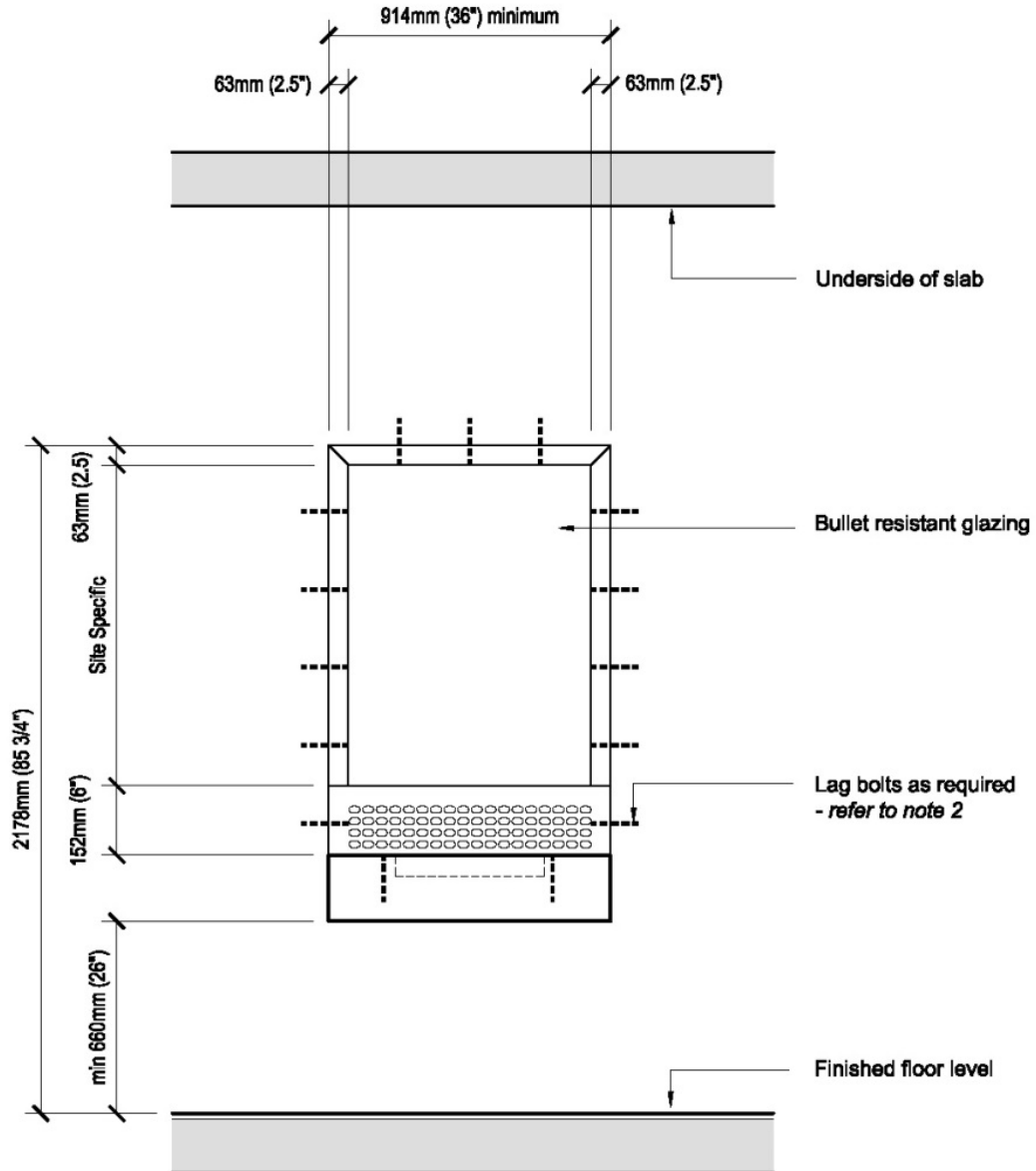
Figure 1.2.4-10 | Reinforcing for Interview Window and Counter



Notes:

1. All joints shall be electrically welded to provide a strength equal or better than the components being welded. Spot welding is not acceptable
2. Reinforcing frame may not be required if installed in Hardened Wall Type 1.

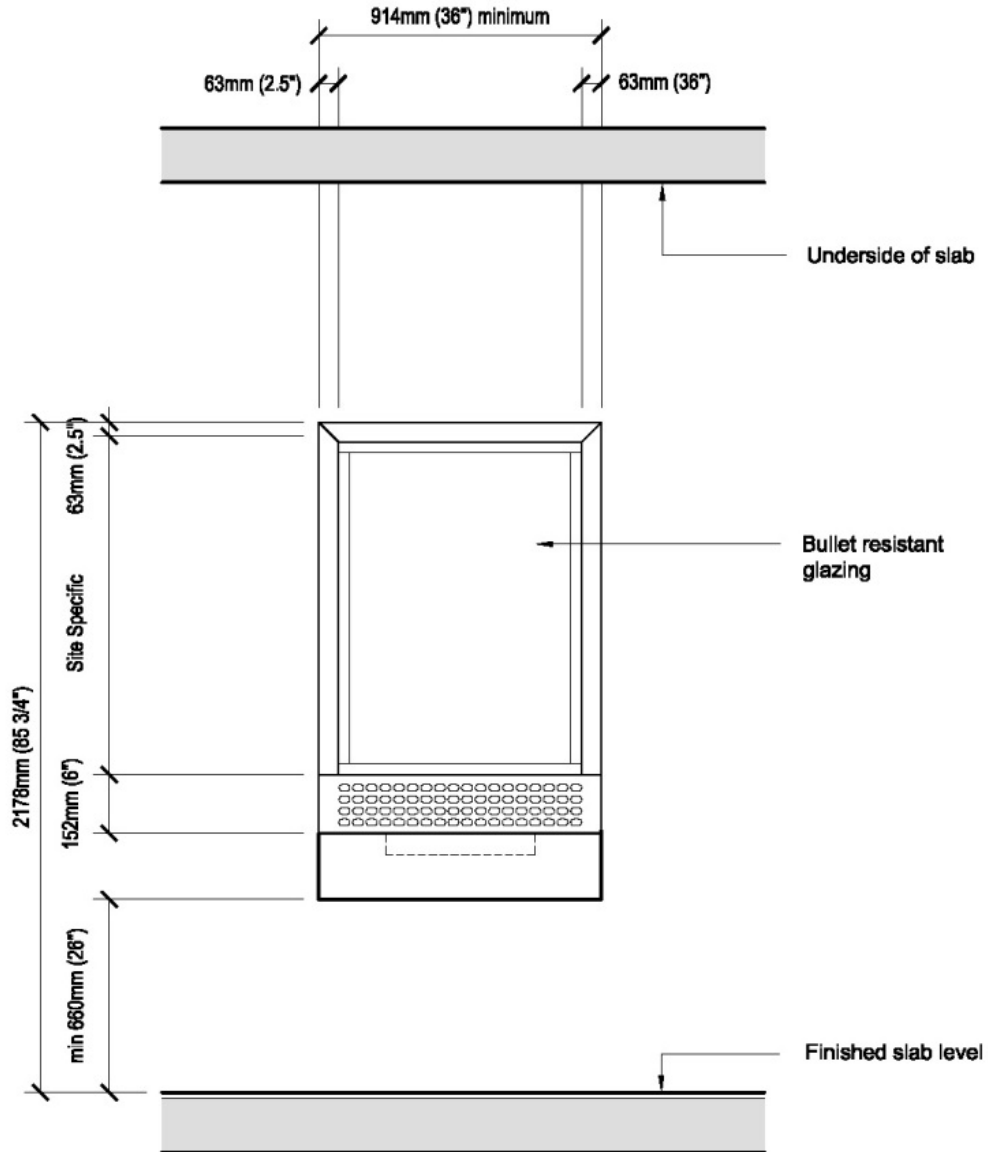
Figure 1.2.4-11 | Interview Window and Counter: Attack Side Elevation



NOTES

1. Refer to Figure 1.2.4-9 for rough opening dimensions.
2. Lag bolts are 10mm dia. x 150mm (3/8" dia. x 6") - *space evenly as required.*
3. Horizontal support under counter may be required if counter depth increases beyond minimum shown.

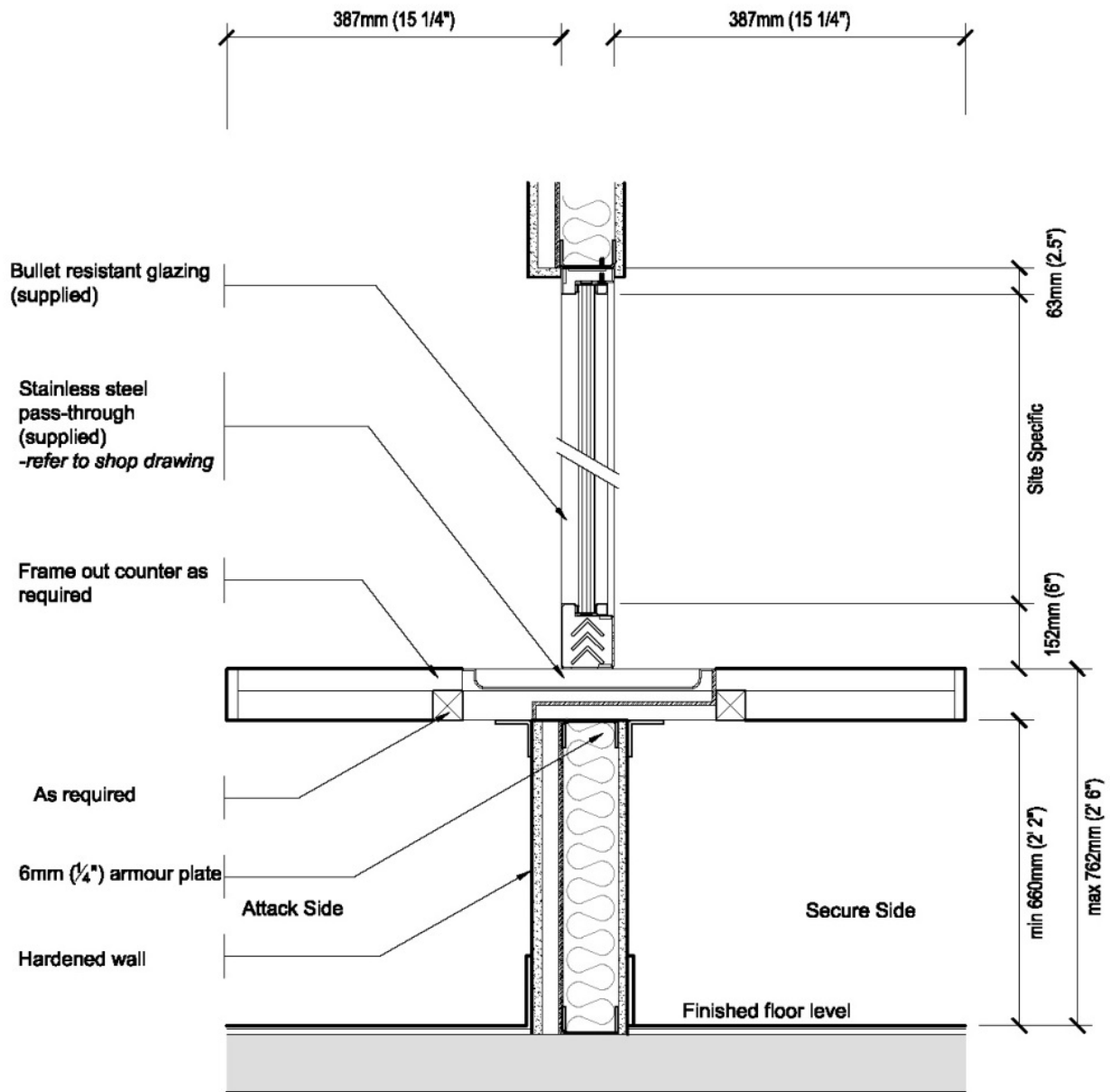
Figure 1.2.4-12 | Interview Window and Counter: Secure Side Elevation



NOTES

1. Refer to Figure 2.4-10 for rough opening dimensions
2. While the sill height of the reception window and counter will vary depending on site conditions, the overall height is as shown.
3. Horizontal support under counter may be required if counter depth increases beyond minimum shown.

Figure 1.2.4-13 | Seated Interview Window and Counter: Vertical Section



C) WALL TYPES

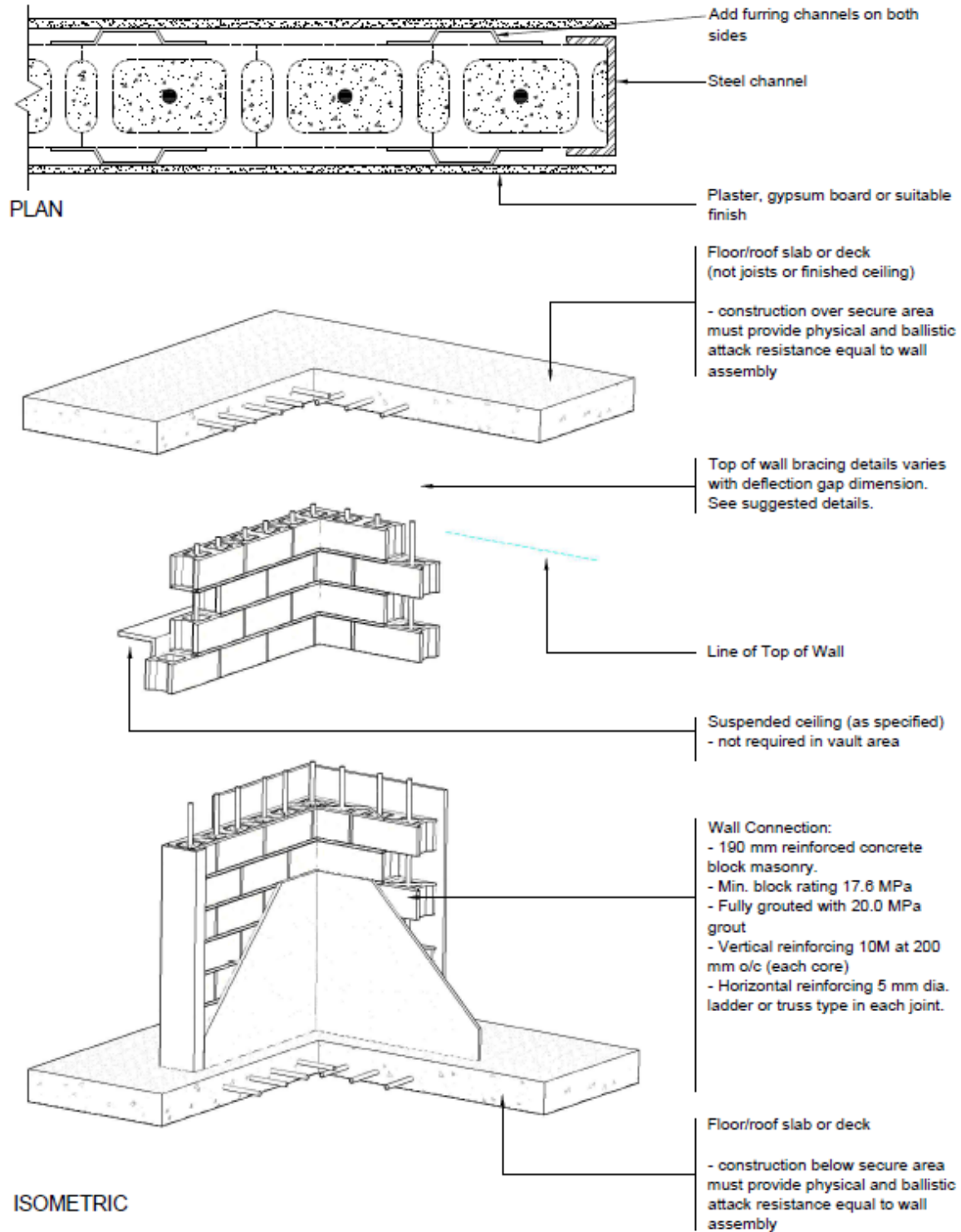
1. Type 1 - Masonry Wall: Bullet Resistant

The following technical requirements must be adhered to in conjunction with the attached generic drawing:

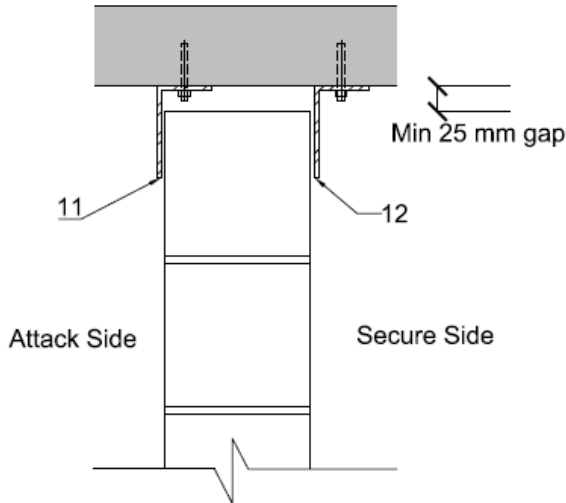
Figure 1.2.2-1 Type 1 - Masonry Wall: Bullet Resistant

- 1.1 The preferred standard wall most readily accepted by DFATD to provide Bullet Resistant protection, with a high degree of physical resistance, is a concrete wall as described below.
- 1.2 This wall will normally be specified for the front entrance bullet-resistant barrier wall, where floor loading permits. 150mm (6") Reinforced concrete or 190mm (8") concrete block with all voids grout filled, **(light weight blocks are NOT ACCEPTABLE)**. If concrete blocks are used, they must be reinforced vertically with 10mm (3/8") diameter reinforcing bars grouted into each void, and each horizontal joint must be reinforced with 5mm (3/16) diameter wire, of ladder or truss design. The concrete mix must be the strongest available locally BUT NOT LESS than 20.0 MPa (2900 psi). Provide a minimum 25mm deflection gap at the top of the wall as per details provided.
- 1.3 This type of construction in a front entrance bullet-resistant barrier wall requires that the wall be constructed to the underside of any dropped or false ceiling, with continuous physically-resistant material to the underside of the slab above. A construction joint at the interface of the new wall and existing slab above is required. The wall must be built up to within 25 mm of the existing slab above, with lateral support provided in the form of steel angles. The angles must be fastened to the underside of the slab only by the use of appropriate Hilti anchors (or approved equivalent), to allow differential slab movement. The steel angle clips lateral support to be continuous along the length of the wall on the secure side of the wall; sections of angles may be spaced at a maximum distance of 1200mm on-centre on the attack side

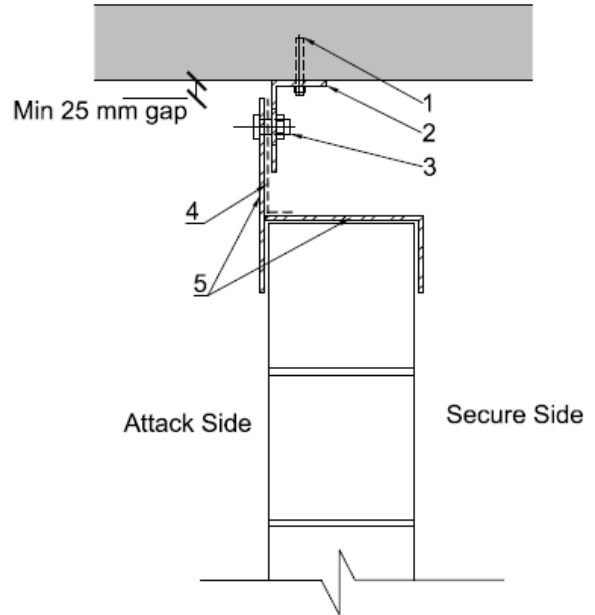
Figure 1.2.2-1 / Type 1 - Masonry Wall: Bullet Resistant



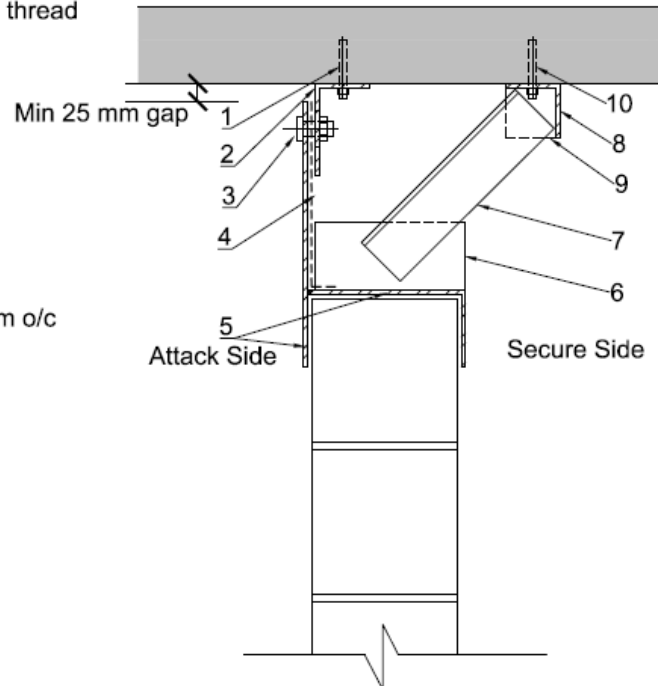
Condition 1 - Deflection Gap 25 to 100 mm



Condition 2 - Deflection Gap 100 to 300 mm



Condition 3 - Deflection Gap over 300 mm



Notes:

1. M10 Kwik Bolt at 600 o/c
2. Continuous L127x76x6,4 (LLV) c/w 50 mm vertical slotted holes at 1200 mm o/c
3. M20 - A325 bolts finger tight and damage thread
4. Flattened steel mesh 1930 F
5. 6 mm welded steel plate assembly 200 mm long at 1200 mm o/c
6. 6 mm vertical stiffener plate
7. L76x76x6,4 diagonal brace
8. L76x76x6,4 - 200 mm long
9. 6 mm stiffener plate
10. 2-M10 kwik bolts
11. Angle (see table) continuous 1-M10 HILTI Kwik Bolt at 600 mm o/c
12. Angle (see table) 150 mm long at 1200mm o/c c/w 1-M10 HILTI Kwik Bolt

Gap	Angle Size
<35mm	L76X76X6,4
35 to 60mm	L127X76X6,4 (LLV)
60 to 100mm	L152X89X7,9 (LLV)

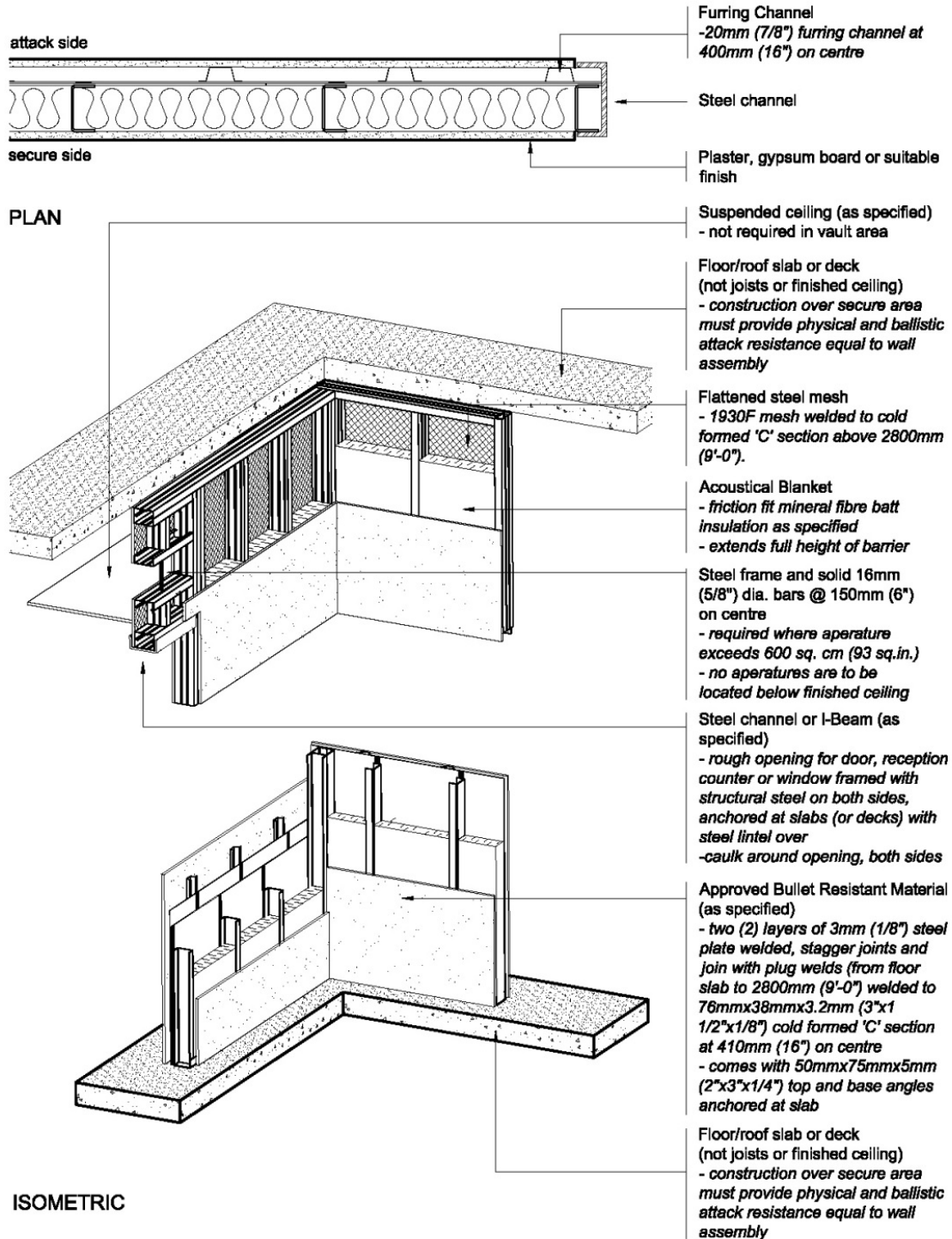
2. Type 2 - Composite Wall: Bullet Resistant

The following technical requirements must be adhered to in conjunction with the attached generic drawing:

Figure 1.2.2-2 | Type 2 - Composite Wall: Bullet Resistant

- 2.1 Bullet-resistant wall normally used as the front entrance barrier wall. One (1) top angle and one (1) base angle 50mm x 76mm x 6mm (2"x3"x1/4") each, anchored to the floor and ceiling slabs with vertical 76mm x 38mm x 3.2mm cold formed 'C' studs at 400mm (16") on center are required. Weld one (1) layer of 6mm (1/4") or two (2) layers of 3mm (1/8") mild steel plate to the exterior or attack side of the studs from floor slab to 2800mm (9'-0") height. Stagger steel plate joints and join with plug welds to each 'C' stud. Weld 1930F steel mesh to 'C' studs from 2800mm (9'-0") height to ceiling slab. Install friction fit insulation in each cavity and cover both the interior and exterior surfaces with the desired finish. A slip connection must be provided at the ceiling slab connection to allow for differential movement of a minimum of 25mm.
- 2.2 In this type of wall construction, an "I" beam or "U" channel frame firmly anchored from slab to slab and a slip connection at top, with a cross member or lintel, must be used to anchor the frame of a DFATD supplied door or a bullet-resistant window

Figure 1.2.2-2 | Type 2 - Composite Wall: Bullet Resistant



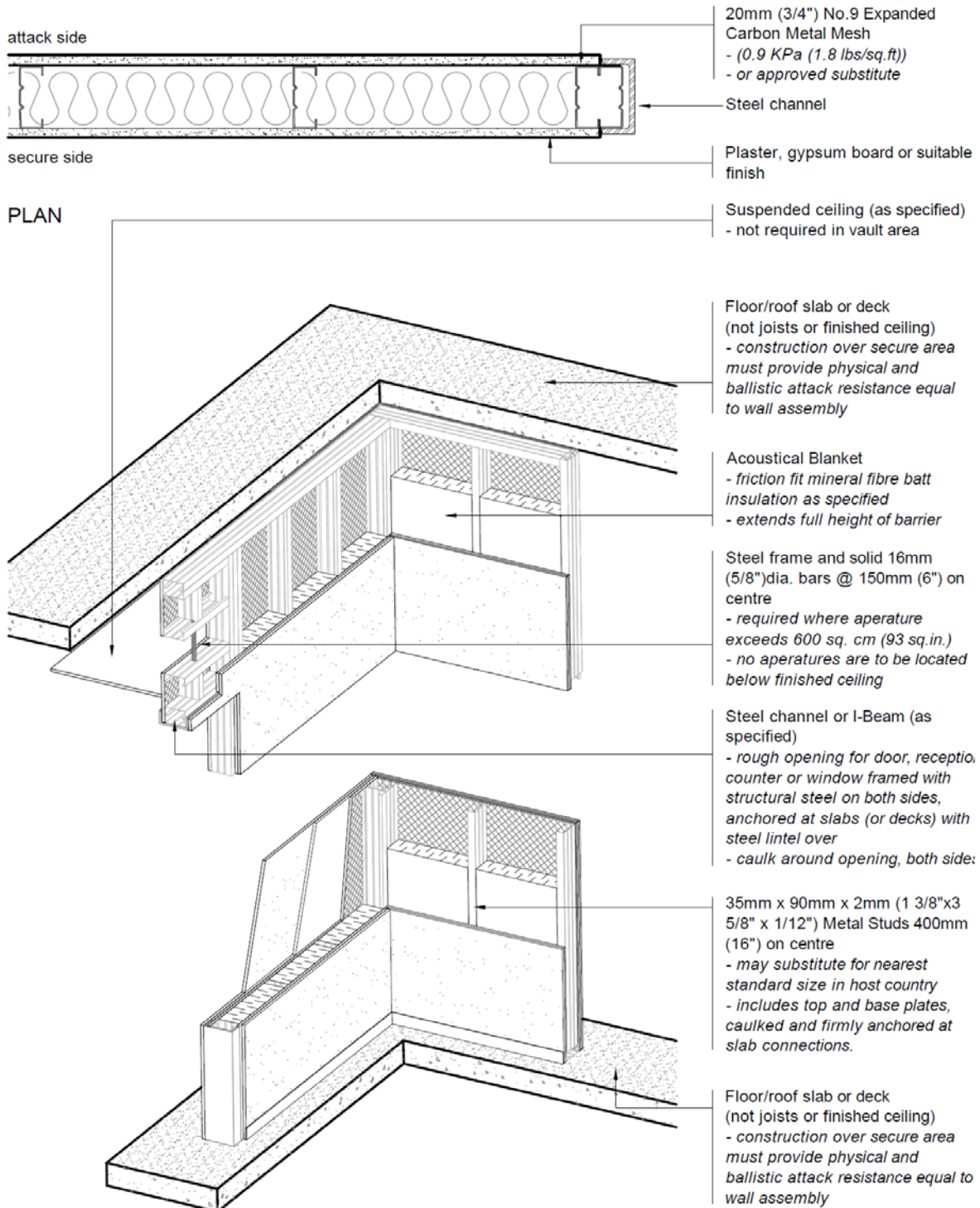
3. Type 3 - Composite Wall: Physically Resistant

The following technical requirements must be adhered to in conjunction with the attached generic drawing:

Figure 1.2.2-3 *Type 3 - Composite Wall: Physically Resistant*

- 3.1 Low level, this wall type is normally used in separating the Operations and Security Zones or in the construction of the perimeter wall where the wall forms a corridor accessible to the public.
- 3.2 One (1) top plate and one (1) base plate, both 100mm (4"), firmly anchored to the floor and ceiling slabs, with vertical studs on 400mm (16") centers are required. Affix a 3mm (1/8") thick mild steel plate or 20mm (3/4") - #9 (10ga.) carbon metal expanded mesh (0.09KPa / 1.8lbs/sq.ft) from slab to slab on the exterior or attack side. Install friction fit insulation for sound attenuation and an appropriate finish to designer's specifications. Any aperture in excess of 600 sq. cm. (96 sq. in.) must be above the false ceiling line and must be protected with 16mm (5/8") diameter solid steel rods firmly anchored on 150mm (6") centers. A slip connection must be provided at the ceiling slab connection to allow for differential movement of a minimum of 25mm.

Figure 1.2.2-3 | Type 3 - Composite Wall: Physically Resistant



ISOMETRIC

D) DFATD SUPPLIED ACCESS CONTROL DOORS AND DOORS AND FRAMES

The following technical requirements must be adhered to in conjunction with the attached generic drawings:

Figure 1.2.3-1 Reinforcing for DFATD Supplied Doors

Figure 1.2.3-2 Door Frame for Bullet and Physical Resistant doors

Figure 1.2.3-3 Air Lock Conduit Layout Plan

Figure 1.3.2-5 DFATD Supplied Door with Access Control (CESS) Conduit Layout

Figure 1.3.2-7 Scramble Pad Bracket Installation

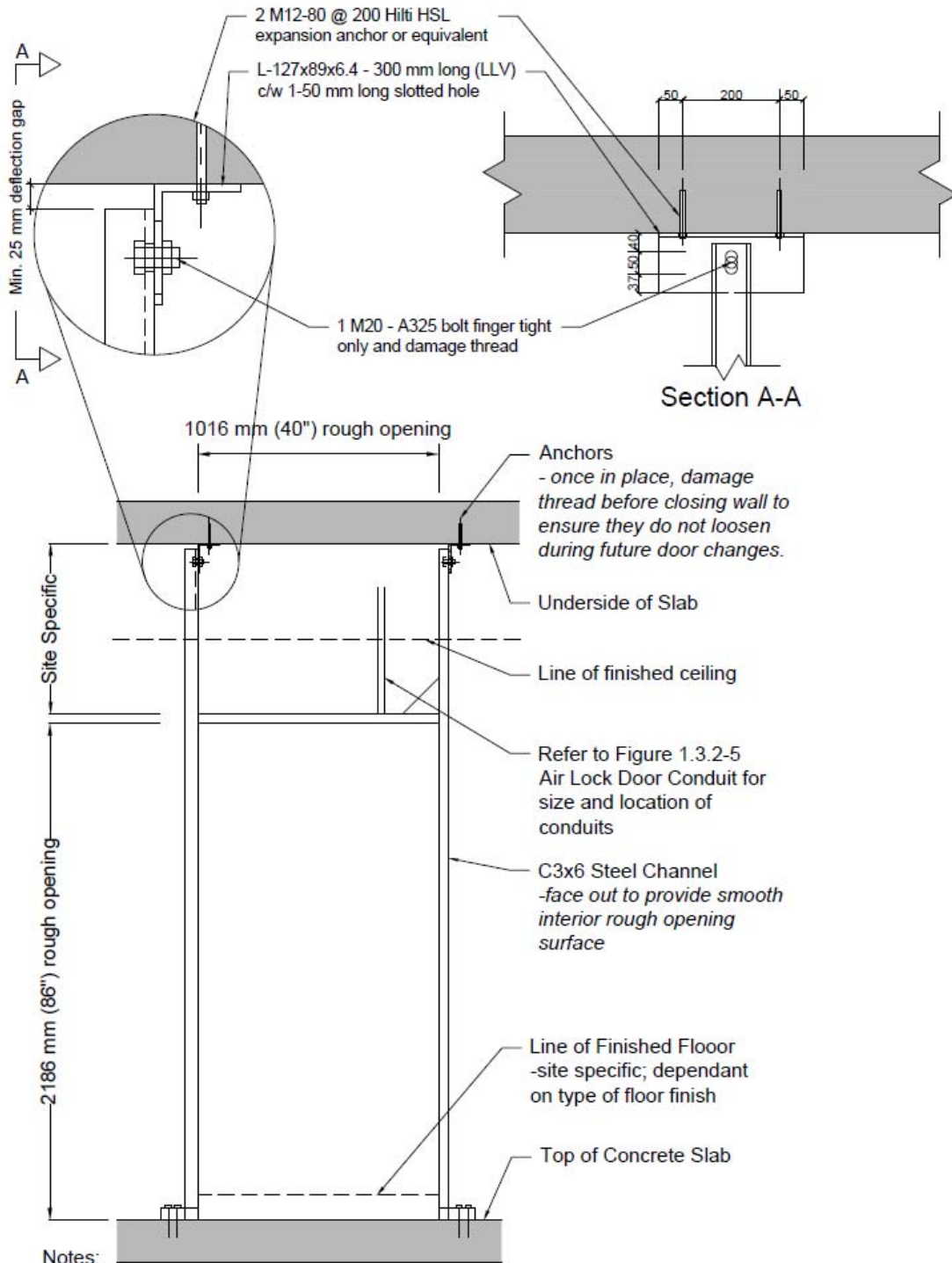
Figure 1.3.2-7A Scramble Pad Bracket Installation

Figure 1.3.2-9 Ceiling Mounted Device Conduit Layout

1. Structural Reinforcing Requirements

- 1.1 Due to the significant weight and the attack resistance of the bullet resistant doors it is necessary to structurally reinforce framed walls to receive these doors.
- 1.2 The Contractor must be responsible for constructing a structural frame which will support the bullet resistant door. Any deviation from this accepted design must be approved by DFATD prior to construction.
- 1.3 The structural frame must be constructed from C75x9 (C3x6) steel "C" channel and must consist of two posts and a lintel. The assembly must be electrically welded with the flat side of the channel facing to the inside of the opening. The posts must extend from floor to ceiling slab and must be securely fastened to both floor and ceiling slabs with an appropriate fastening system, while providing a slip connection allowing minimum 25mm differential deflection. The fasteners must be tack welded to ensure they do not become loose over time. Once assembled, the framework must provide a rough opening of no less than 1016mm (40") wide x 2185mm (86") high (from finished floor) into which the door and frame must be installed.
- 1.4 The Contractor must provide the conduit infrastructure to accommodate the access control requirements of the doors as per **Figure 1.3.2-5, 1.3.2-7 and/or 1.3.2-7A**

Figure 1.2.3-1 | Reinforcing for DFATD Supplied Doors



1. All joints shall be electrically welded to provide strength equal or better than the components being welded. Spot welding is not acceptable.

Figure 1.2.3-2 | Door Frame for Bullet and Physical Resistant doors

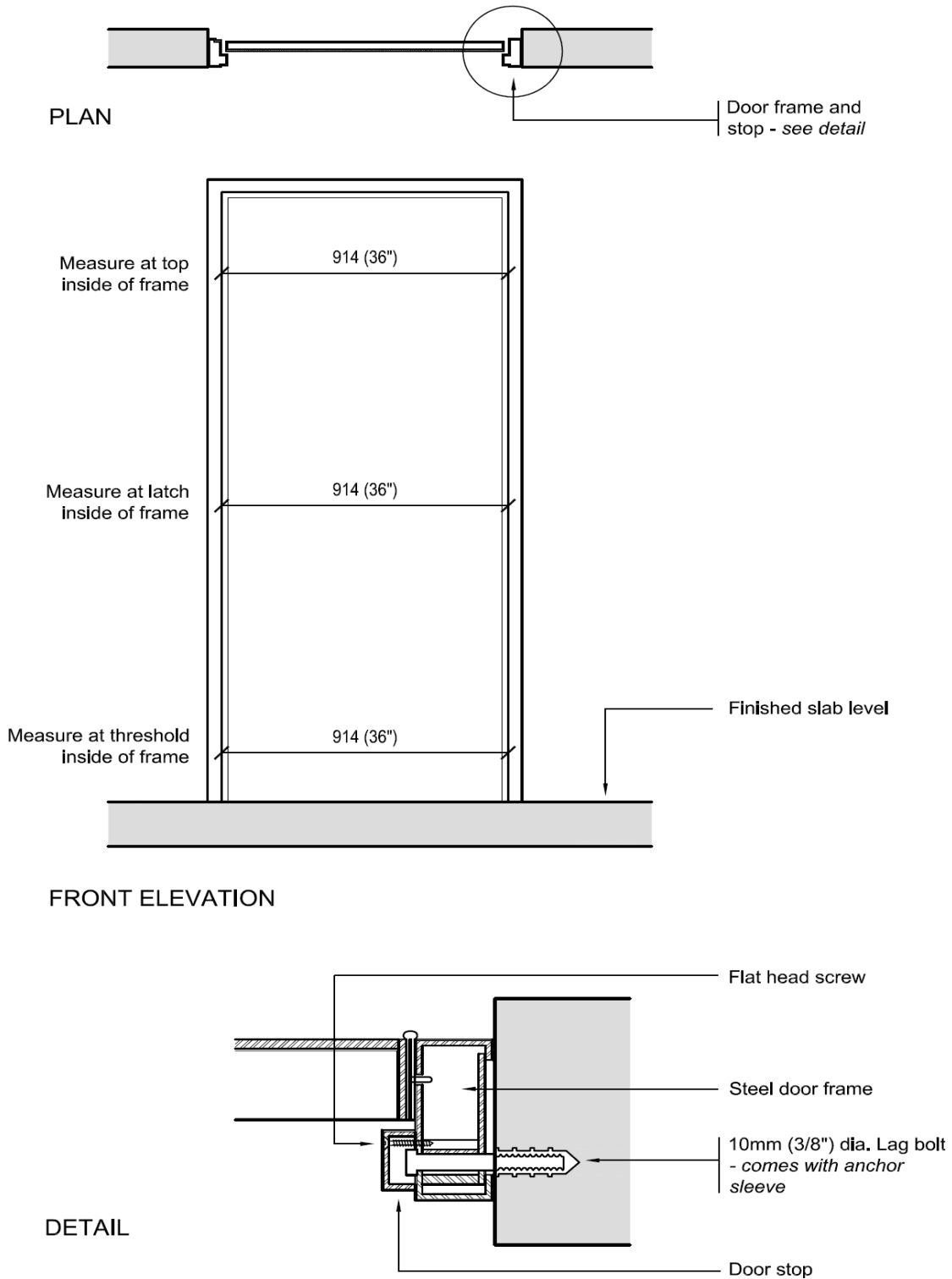
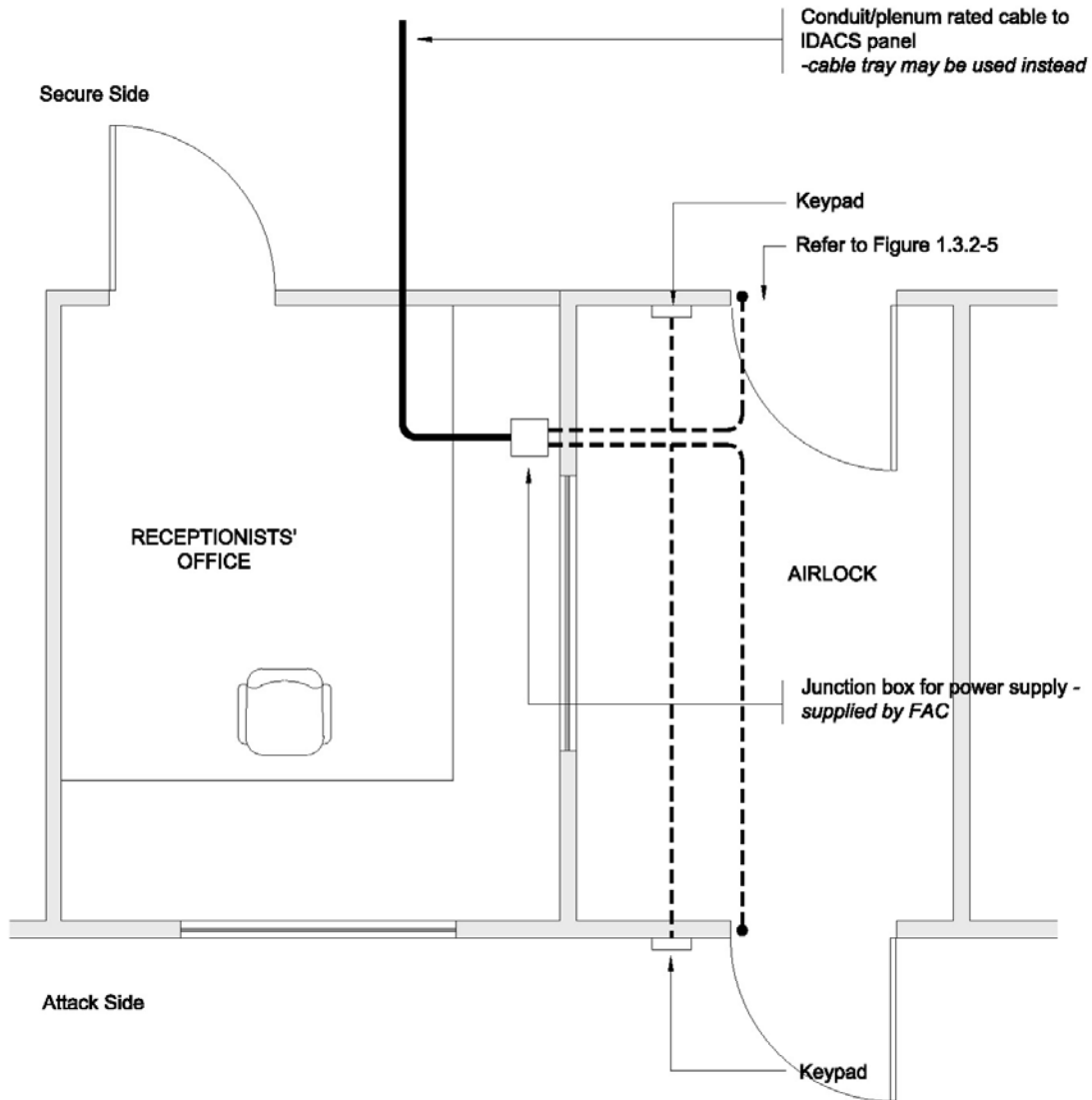


Figure 1.2.3-3 | Airlock Conduit Layout Plan

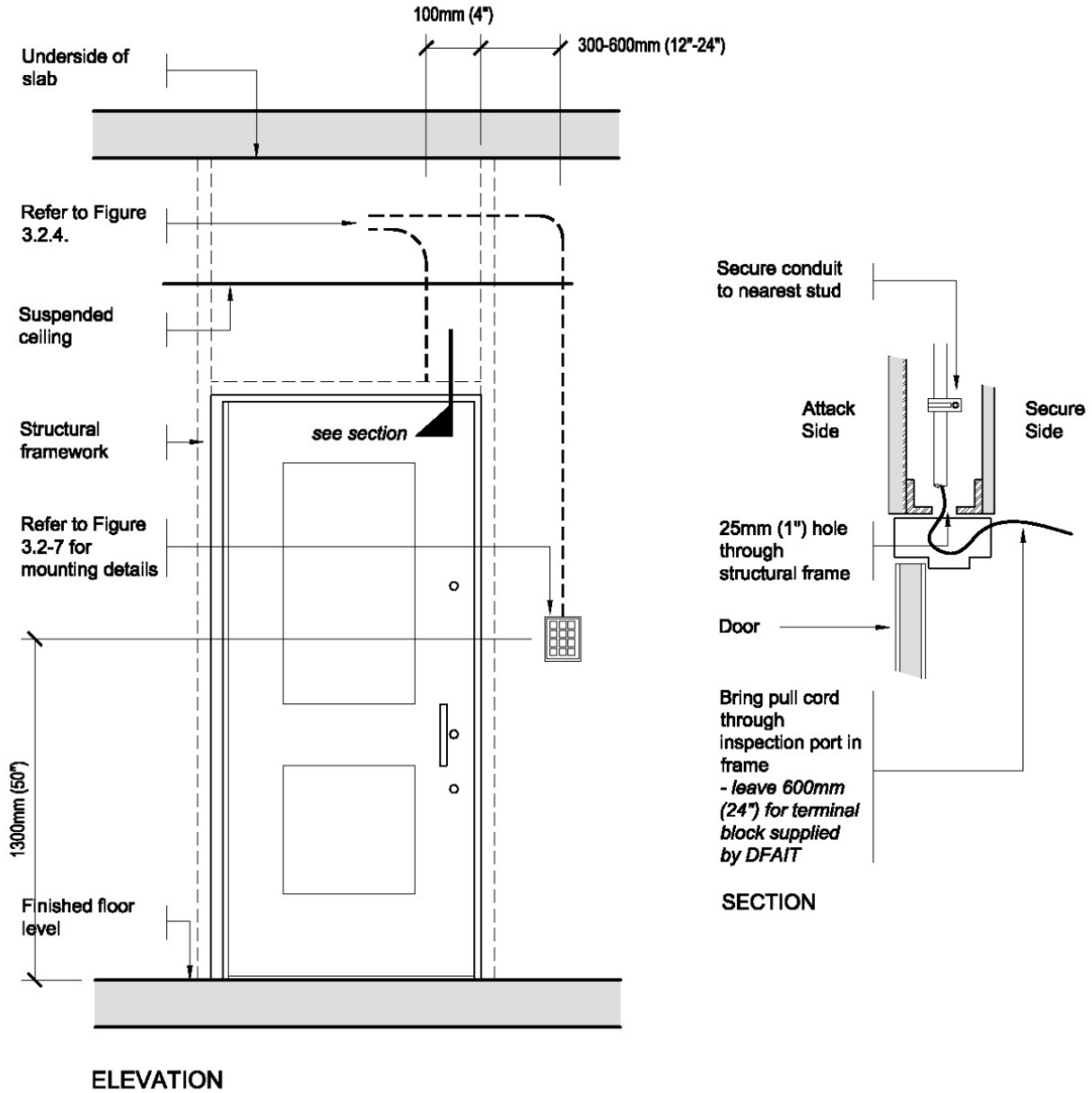


NOTES

1. Any deviation from this layout must be documented and approved by DFAIT prior to construction.
2. Where codes allow, conduit will be terminated in ceiling space and a plenum rated cable shall be used.

--- 25mm (1") Conduit c/w Nylon Pull Cords — 38mm (1.5") Conduit c/w Nylon Pull Cords

Figure 1.3.2-5 | DFATD Supplied Door with Access Control (CESS) Conduit Layout

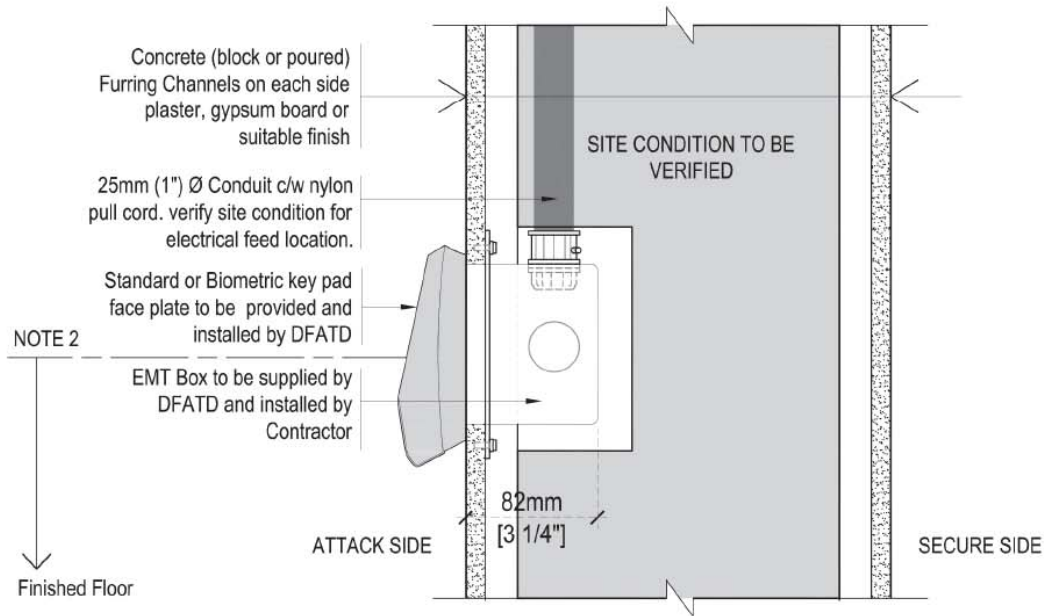


NOTES

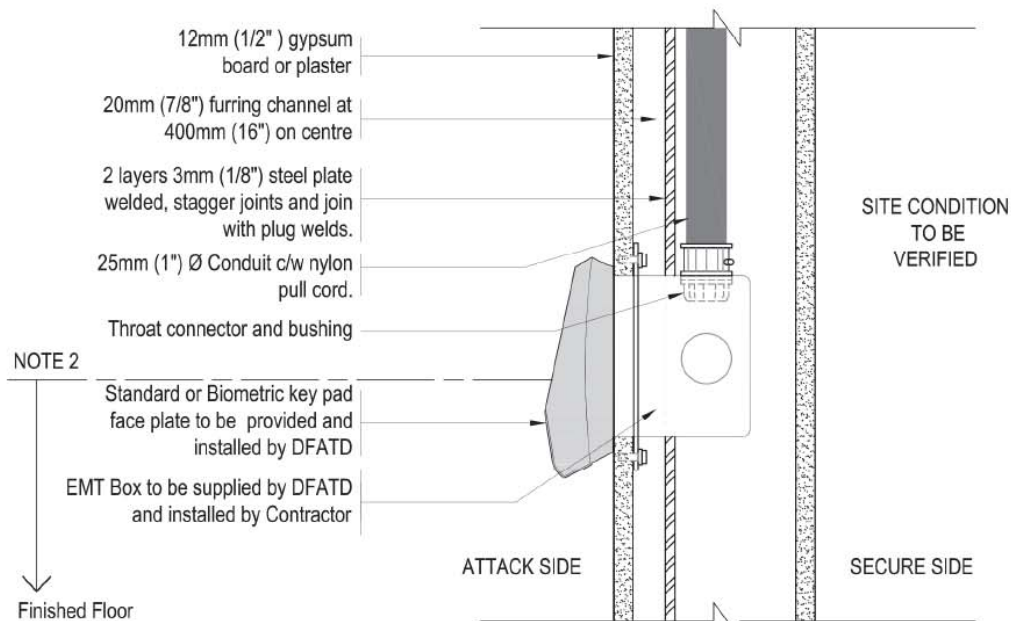
1. Any deviation from this layout must be documented and approved by the project authority prior to construction.
2. Where codes allow, conduit will be terminated in ceiling space and plenum rated cable used.

--- 25mm (1") Conduit
c/w Nylon Pull Cords

Figure 1.3.2-7 | Scramble Pad Bracket Installation



INSTALLATION IN HARDENED WALL TYPE 1 : BULLET RESISTANT MASONRY WALL

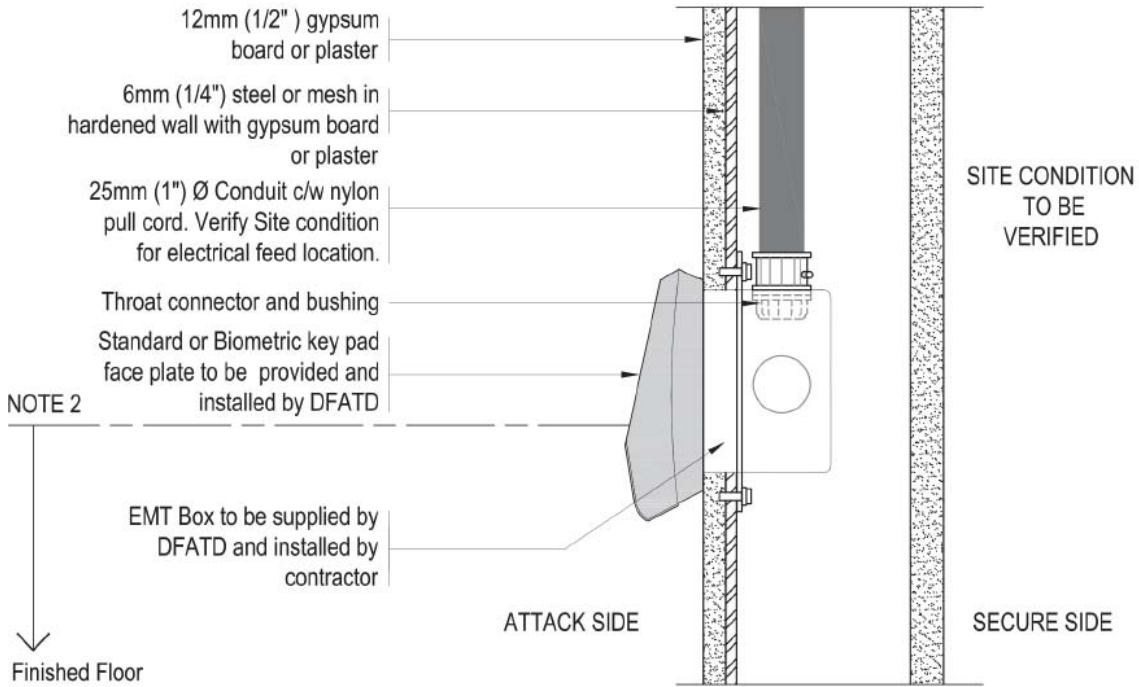


INSTALLATION IN HARDENED WALL TYPE 2 : BULLET RESISTANT COMPOSITE WALL

NOTE

1. Verify site condition for location of conduit feed.
2. Standard key pads and biometric keypads are to be mounted 1200mm (47") from midpoint of face plate to finished floor.

Figure 1.3.2-7A | Scramble Pad Bracket Installation

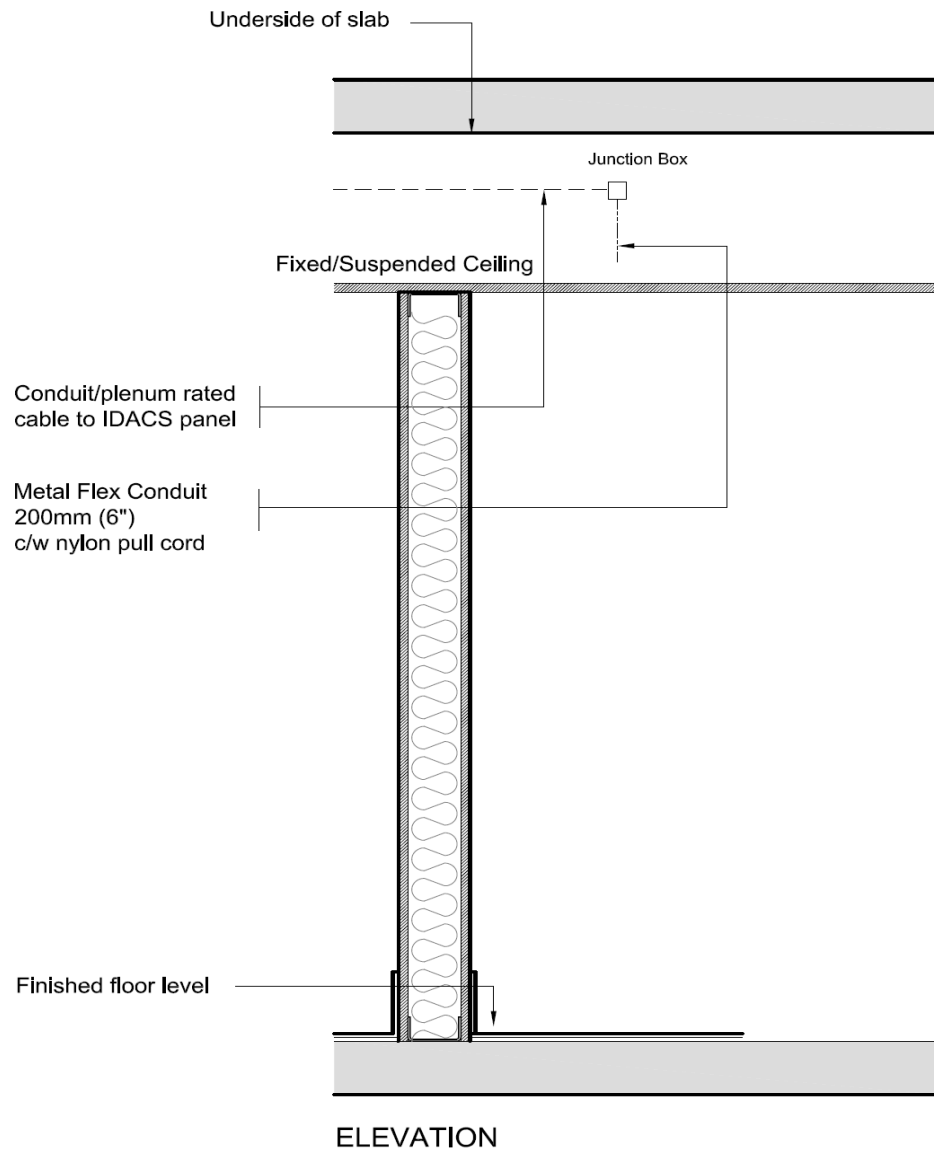


INSTALLATION IN HARDENED WALL TYPE 2 : BULLET RESISTANT COMPOSITE WALL

NOTE

1. Verify site condition for location of conduit feed.
2. Standard key pads and biometric keypads are to be mounted 1200mm (47") from midpoint of face plate to finished floor.

Figure 1.3.2-9 | Ceiling Mounted Device Conduit Layout



NOTES

1. A fixed ceilings will require a minimum access hatch of 46mm x 46mm (18" x 18").

--- 25mm (1") Conduit

----- 20mm (3/4") Conduit

E) VAULT DOOR AND DAY GATE

The following technical requirements must be adhered to in conjunction with the attached generic drawings:

Figure 1.2.5-1 Reinforcing for Vault Door

Figure 1.2.5-2 Vault Door Details

Figure 1.2.5-3 Vault Door Day Gate Details

1. Structural Reinforcing Requirements

- 1.1 Due to the significant weight and the attack resistance of the vault doors it is necessary to structurally reinforce framed walls to receive these doors.
- 1.2 The Contractor must be responsible for constructing a structural frame which will support the vault door. Figure 1.2.5-1 details the frame construction for a typical building. Any deviation from this accepted design must be approved by DFATD prior to construction.
- 1.3 The structural frame must be constructed from C150x19 (C6x13) steel "C" channel and must consist of two posts, cross bracing, and a lintel. The assembly must be electrically welded with the flat side of the channel facing to the inside of the opening. The posts must extend from floor to ceiling and must be securely fastened to both floor and ceiling slabs with an appropriate fastening system. A slip connection must be provided at the ceiling slab connection to allow for differential movement of a minimum of 25mm. The brace should extend from the hinged side of the door (lower end) to the vertical located on the opposite side (not to the underside of the slab above). Once assembled the framework must provide a rough opening of no less than 1000mm (39.25") x 2064mm (81.25") into which the door and frame must be installed.
- 1.4 The framework must be provided with junction boxes and associated conduit to accommodate the electrical requirements of the door as per Figure 1.2.5-2.

Figure 1.2.5-1 | Reinforcing for Vault Door

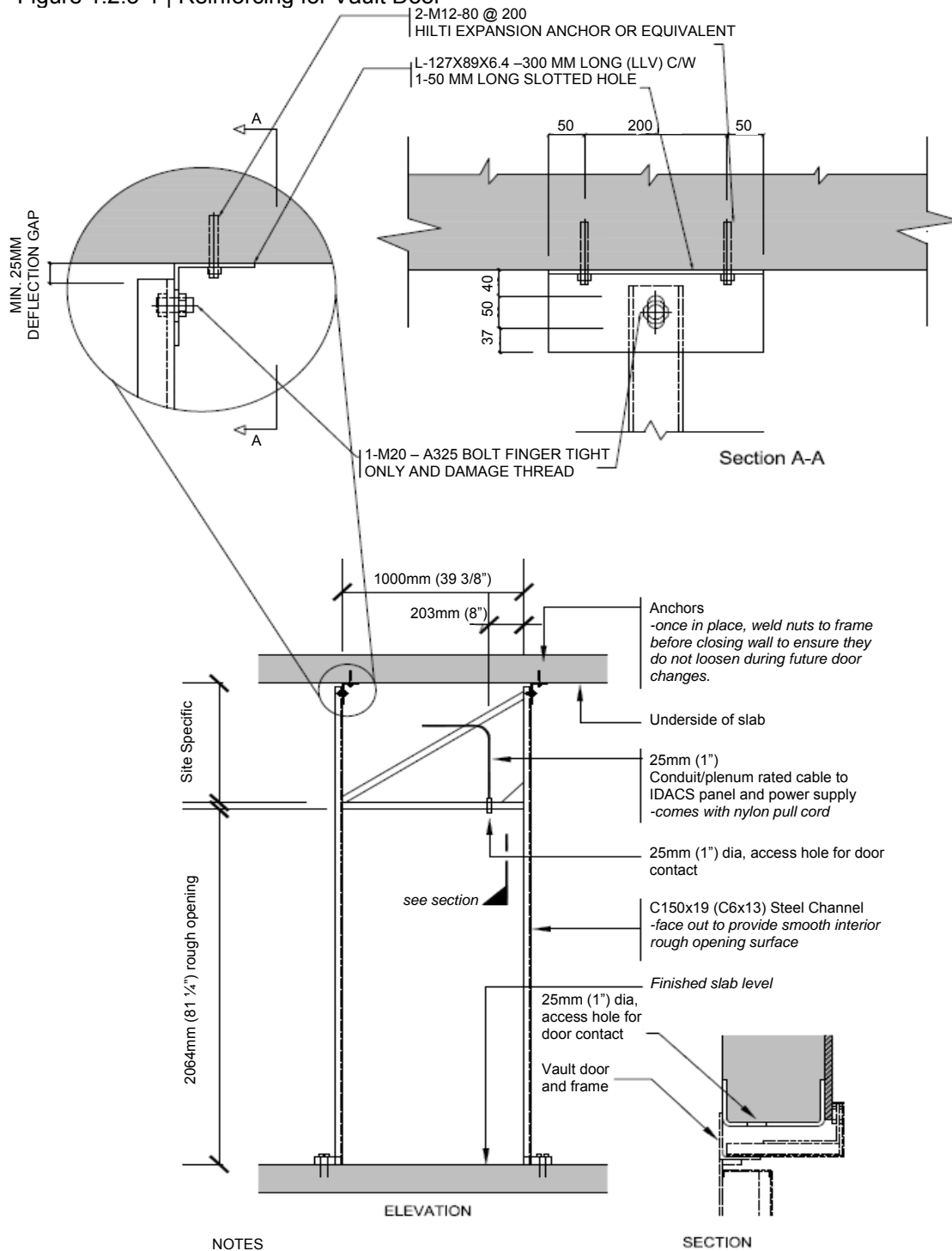
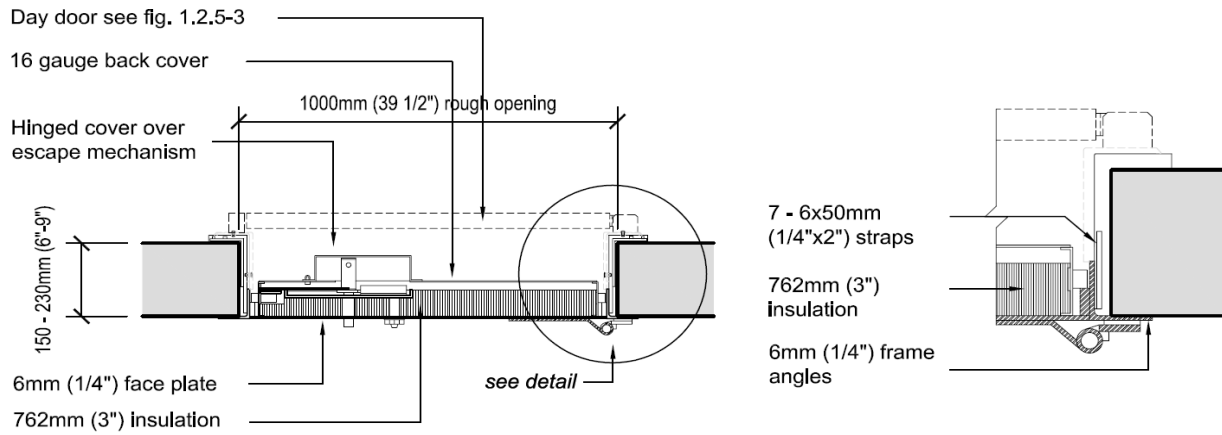
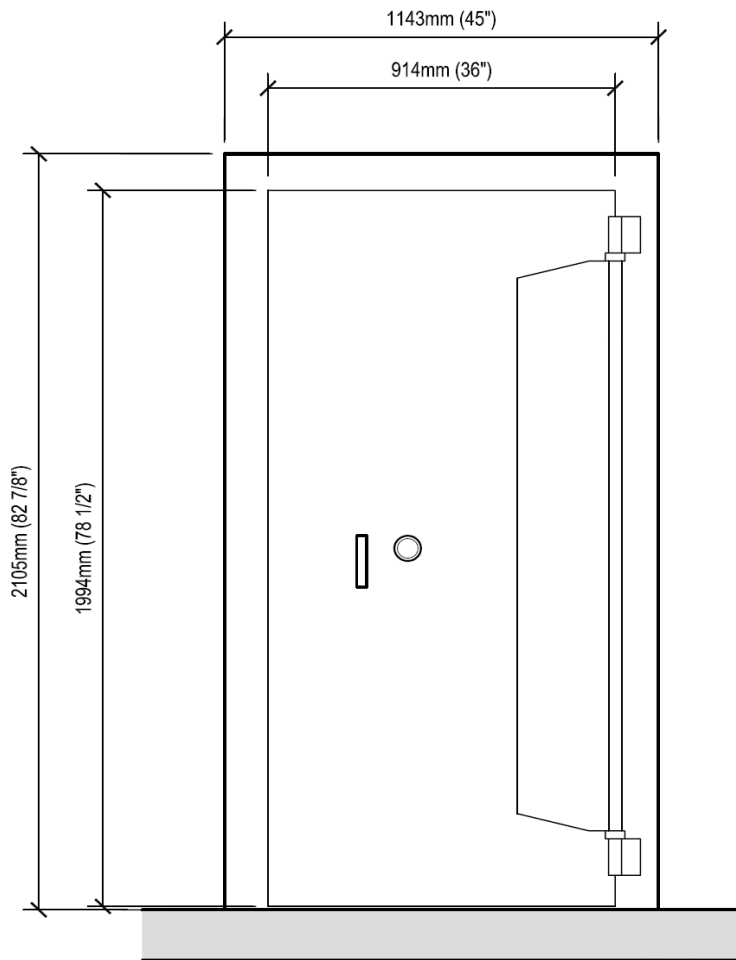


Figure 1.2.5-2 | Vault Door Details

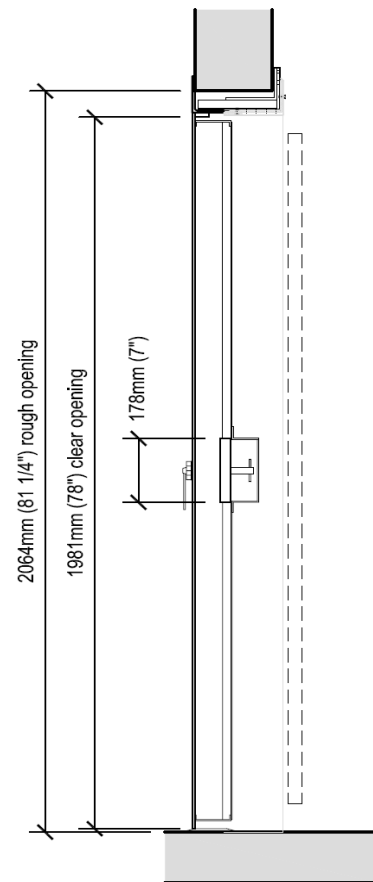


PLAN



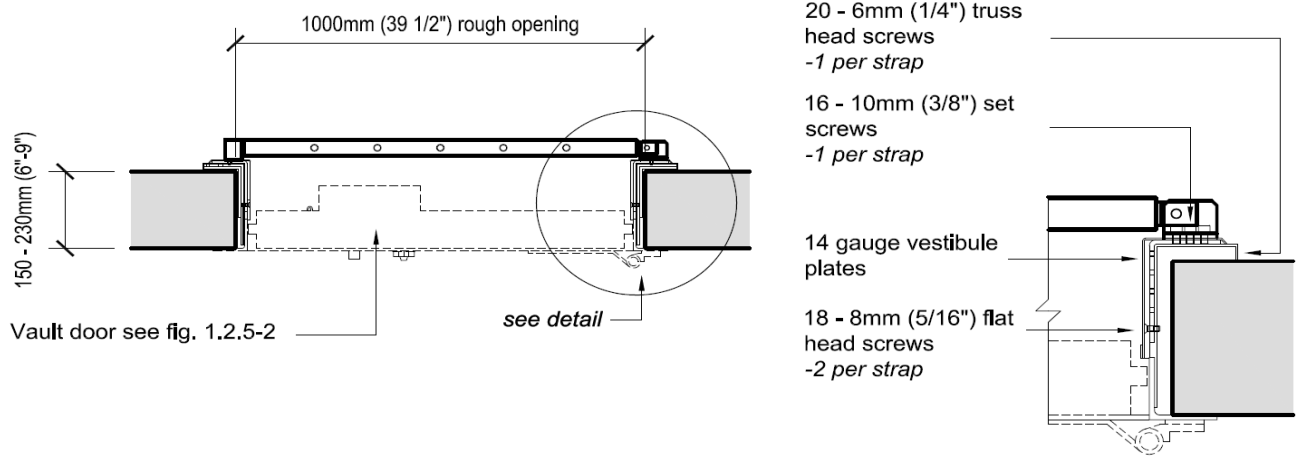
ELEVATION

DETAIL

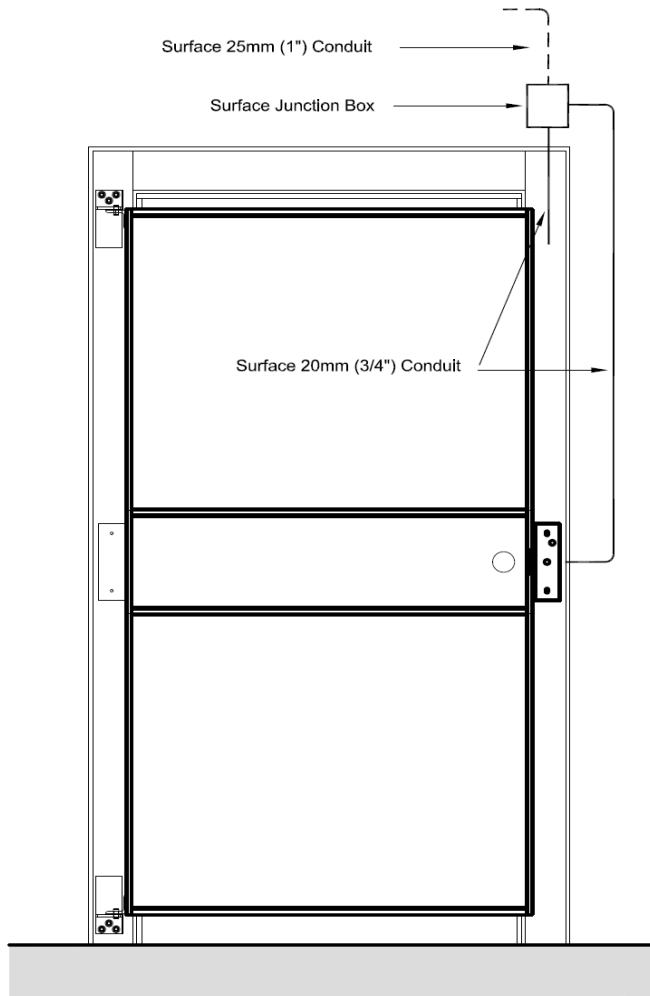


SECTION

Figure 1.2.5-3 | Vault Door Day Gate Details

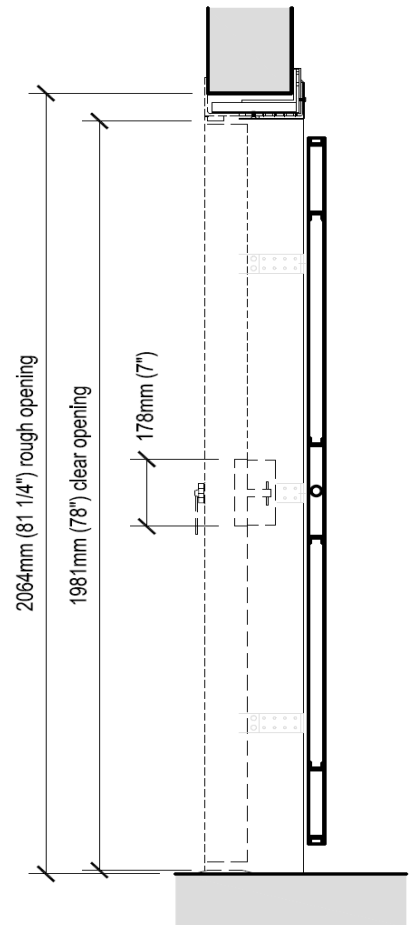


PLAN



ELEVATION

DETAIL



SECTION

Chancery Consolidation Abidjan, Côte d'Ivoire

Performance Specification

Part 7

Information Communication Technology (ICT) and Multimedia

<p>Abidjan: Chancery Consolidation</p> <p>Project No. B-ABDJN-100</p>	<p style="text-align: right;">Project Brief</p> <p style="text-align: center;">Performance Specification - Part 7 Information Communication Technology (ICT) and Multimedia</p>
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PART 7 – INFORMATION COMMUNICATION TECHNOLOGY (ICT) AND MULTIMEDIA

A) SCOPE AND GENERAL REQUIREMENTS

1. Scope

1.1 Provide ICT infrastructure as specified herein to meet the DFATD technical performance standards. The work must include, but is not limited to the following:

- a) Infrastructure for DFATD Voice/Data Networks.
- b) Infrastructure for DFATD IP Based Services (Public Phone, Internet, IPTV, IP CCTV, ex.)
- c) Infrastructure for Cable Television (CATV).
- d) Multimedia (Audio/Video Systems).

2. General Requirements

2.1 ICT installations must be coordinated with mechanical, architectural, structural, interior design and life safety requirements. All systems shall become an integral part of the complete design package, well incorporated into building functional design and must be aesthetically pleasing.

3. Performance Requirements

3.1 Requirements

- 3.1.1 Infrastructure and equipment must be fail-safe and meet design requirements of a quality consistent with anticipated minimum life expectancy of 25 years.
- 3.1.2 Infrastructure and equipment selection must be justified in accordance with the project requirements. The selection must consider performance, service and maintenance, as well as reliability, durability, sustainability, flexibility, accessibility and ease of operation and maintenance by non-specialized personnel, availability of parts, total cost of ownership, and operational economy.
- 3.1.3 Infrastructure and materials must provide pollutants-free operation. DFATD sustainability policies must be respected for all electrical work. Refer to Part 1 - General Project Requirements.

4. Design

4.1. Requirements

- 4.1.1 In order to achieve flexibility and thorough integration between building architecture and engineering systems, a concept for ICT infrastructure that supports the distribution of the selected systems should be established during the architectural schematic design. The locations of vertical/horizontal pathways, closets, equipment rooms, ICT distribution equipment should be established before the architectural concept is finalized.

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- 4.1.2 All ICT systems and equipment must be configured in a manner that is readily and safely accessible for routine maintenance and repair.
- 4.1.3 Lighting in equipment rooms should be laid out so as not to interfere with equipment.
- 4.1.4 The equipment distribution must be laid out to minimize the effects of external or internal electrical disturbances. This means disturbances from building equipment such as large motors, air conditioning, etc., shall not impact on operation of sensitive equipment.

4.2 Drawings

The following drawings are expected to be a part of the design package (expected to be delivered in PDF and CAD file format):

4.2.1 ICT Raceway Plan

This plan must illustrate all ICT raceways. The plan should give a clear depiction of **all** ICT vertical and horizontal raceways including backbone conduit, level 0/1 trays in the floor and in the plenum; locations and types of each voice/data outlet/box/column. The plan should differentiate between all types of voice/data outlet installations. It should also include a detailed legend with descriptions of each. It must be used in conjunction with a consolidated services plan and reflected ceiling plan to ensure proper access and space considerations have been given to the plenum/floor. Also included in the plan is a list of details for each technical room describing any special works such as backboards or millwork (detailed in this brief).

4.2.2 MPR A/V Design Package

A detailed audio/video design package for the multi-purpose room (MPR). This package must include but not be limited to the following:

a) Statement of Work

A summary of required audio/video work. This must include a detailed bill of quantities (BOQ) with a list of all planned equipment. An installation plan; which should include:

- System screen and flow design.
- An outline of planned acceptance testing.
- An outline of planned client training.
- A list of training material to be provided.
- On-going support procedures.

b) General Audio/Visual Design Layout

A technical drawing that must illustrate the location of main audio/video equipment (displays, speakers, video conference cameras, control panels...) and furniture in the MPR (lecterns, equipment racks or custom furniture).

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c) Detailed Audio/Visual Design

A technical drawing for the MPR illustrating all audio/video and control equipment listed in the BOQ; as well as **each** link and input between all systems. This plan should be detailed and should clearly indicate all connections between each audio/video and control node in the plan.

B) APPLICABLE CODES AND STANDARDS

1. Code Compliance Requirements

For a complete description of the code compliance requirements refer to:

- Part 1 – General Project Requirements
 - A) GENERAL INFORMATION
 - 3. Codes, Regulations, By-Laws

2. Specific Codes and Standards

- a) Electronic Industries Alliance / IT Industry Association (EIA/TIA) Standards.
- b) EIA/TIA Standard 568: Commercial Building IT Wiring Standard (and related bulletins)
- c) EIA/TIA Standard 569: Commercial Building Standard for IT Pathways and Spaces (and related bulletins)
- d) EIA/TIA Standard 606: Administration Standard for the Commercial IT Infrastructure (and related bulletins)
- e) EIA/TIA Standard 607: Commercial Building Grounding (Earthing) And Bonding Requirements for IT (and related bulletins)

C) DETAILED REQUIREMENTS

1. ICT & MULTIMEDIA

1.1 ICT Wiring, Raceways, and Outlets

1.1.1 Wiring

DFATD supplies installs and maintains its own proprietary voice and data systems within the Consulate\Embassy. DFATD will supply and install all of the required internal cabling and ICT equipment throughout the Consulate\Embassy. It is expected that the Contractor will provide the back boxes, support frames, faceplates, and plugs (RJ45 & fiber-optic) for all voice, data, and multimedia drops detailed in this Project Brief.

1.1.2 Raceways

The Contractor must install all ICT raceways detailed in Part 5 – Electrical Engineering

- A) GENERAL
 - 9. Identification

Figure 2, Figure 3 and Figure 4.

ICT raceways include all conduit, cable trays (both mesh and enclosed) and trunking systems used to carry ICT services from technical rooms to points of service (computers, telephones, WiFi access points, or any IP based Government of Canada nodes). The Contractor must ensure:

- a) All conduit used must be ridged steel threaded EMT unless otherwise specified.
- b) All conduit used must be color coded as outlined in Part 5 - Electrical System Requirements in this scope of work.
- c) All raceways must be grounded as outlined in t in Part 5 - Electrical System Requirements in this scope of work.
- d) When selecting the size of the ICT conduit or tray; the Contractor must consider the following:
 - Each workstation requires 4x Cat6 UTP cable. Conduit/Tray must be wired for a fill ratio of 40% in accordance with DFATD cabling standards. See:
 - Figure 1 for fill ratio details.
 - There must be no consecutive 90 degree bends or (3) consecutive 40 degree bends in conduit installed in the plenum. Access boxes must be used to avoid consecutive bends. The size of the access box installed depends on the bend radius of the cable expected to pass through ICT. Access boxes in the plenum smaller then 100mm L x 100mm W x 50mm D is not acceptable in any scenario.
 - No conduit run must be longer than 10 meters without an access box.
 - All access boxes and raceways should be accessible. Cable trays require a **minimum** of 6 inches of clearance for proper access.
 - No raceways can be used in the public zone. Any areas accessible to the public must be restricted to steel conduit to restrict access.

Figure 1 - CAT6 UTP Cable Fill Ratios

Plenum			No. of Cables at 40% Conduit Fill Based on Trade Size of the Conduit (inches)								
			0.75	1	1.25	1.5	2	2.5	3	3.5	4
Cable	Type	O.D.									
Category 6											
Cat 6	4 pr F/UTP	0.255	3	6	9	14	24	38	55	75	98

1.1.3 ICT Raceway Types

a) Backbone Conduit

Backbone conduit is defined as a collection of steel EMT conduits interconnecting all the technical rooms (TC, DP, MSR, IDACS, DCC, MPR-AV, CCC, CSCR, CCR, Public Safety). These conduits must be secure steel EMT (threaded) unless otherwise specified. These conduits must be clearly marked in accordance with this Project Brief. All backbone conduits must be terminated on a “C” channel 280mm below or above a backboard. See Part 5 – Electrical Engineering

A) GENERAL

9. Identification

Figure 2 for backbone conduit requirements and Figure 3 for backboard requirements. All conduits must have a nylon pull string installed for cable pulling.

b) Level 0 Raceways

Level 0 raceway is defined as a raceway (cable tray or conduit system) to carry all non-government or “external” voice/data services (example: television, outside internet service, A/V) to the appropriate technical room. This raceway can only be installed in the public and operational zones. This raceway can be combined with the Level 1 raceway if a cable tray with a physical divider is used.

c) Level 1 Raceways

Level 1 raceway is defined as a raceway (cable tray or conduit system) to carry all DFATD voice/data (as well as other DFATD IP services) services to the nearest TC within the appropriate zone. This raceway cannot cross between zones.

d) Level 2 Raceways

Level 2 raceway is defined as a raceway (cable tray or conduit system) to carry all DFATD classified data services to the nearest classified communications center (CCC). This raceway will be installed in the secure and high secure zone **only** and must be “secure”. Secure with respect to the level 2 raceway must be defined as threaded 19mm steel EMT conduit from CCC to each outlet; **or** a sealed raceway system from CCC to each outlet. All cable carried in the raceway must not be exposed at any point, the raceway cannot be combined with any other raceways, and the raceway must be clearly marked as per:

Part 5 – Electrical Engineering

A) GENERAL

9. Identification

Figure 2- ICT Backbone Conduit Requirements

Qty.	Type	Size	From	To	Color Code
2	PVC Conduit	100mm	Building Telecom Riser	DP	Orange/Yellow

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2	EMT Conduit	50mm	DP	DCC	Orange/Yellow
1	EMT Conduit	50mm	DCC	MSR	Orange

Figure 3 – ICT Backboard Requirements

Room	Stand-off(#)	Width (mm)	Height (mm)	Thickness (mm)	Offset Wall	Offset Floor	Paint	Supplementary Backboard Required?	On Plexi-glass?
DP	4	1200	1800	20	200	609	Flame Retardant – Flat Gray	Yes	No
DCC	4	1200	1200	20	200	900	Flame Retardant – Flat Gray	No	No
MPR AV Room	4	1200	1200	20	200	900	Flame Retardant – Flat Gray	No	No

Figure 4 – ICT Raceway Requirements

Qty	Type	Size	From	To	Level
*	Cable Tray	TBD	Each voice/data outlet in the 7 th floor Operational Zone	DCC	Level 1/0
*	EMT Conduit	19mm	Each voice/data outlet in the 7 th floor Public Zone	DCC	Level 0
*	EMT Conduit	19mm	Each Camera in the Public Zone	DP	Level 0
*	Cable Tray	TBD	Each Camera in the 7 th floor Operational Zone	DCC	Level 1
*	Cable Tray	TBD	Each WiFi hotspot in the 5 th floor Operational Zone	DCC	Level 1/0
*	Cable Tray	TBD	Each voice/data outlet in the Secure/High Secure Zone	MSR	Level 1
*	EMT Conduit or Secure (closed) raceway.	19mm or Tray (size TBD)	Each workstation in the Secure/High Secure Zone.	MSR	Level 2

1.2 Outlets

The installation of all voice/data outlets, boxes and columns is the responsibility of the Contractor. A minimum of 1x 19mm flexible steel conduit must be connected to each voice/data outlet, box, or column. Metal flex conduit must be secured to the box and to the cable tray with the appropriate fitting and locknut. Conduit must extend horizontally/vertically through the floor or plenum to the appropriate raceway. Nylon pull string must be installed in **all** conduit runs.

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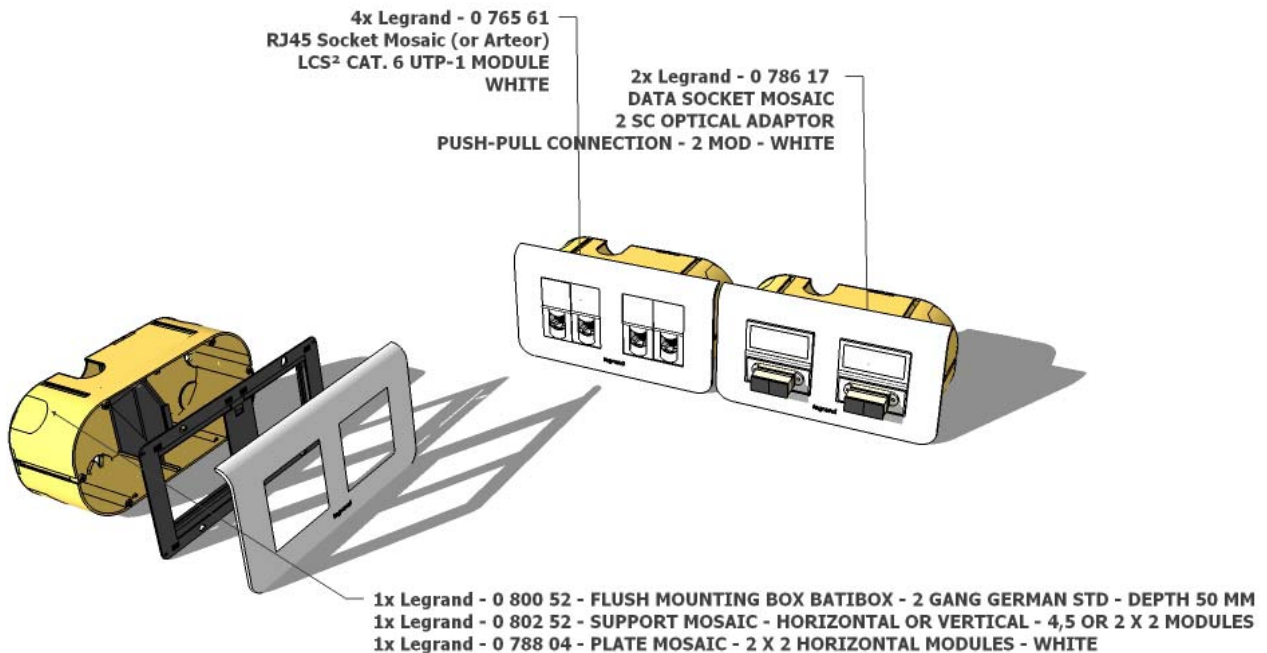
All voice/data outlets/boxes/mini-columns must be installed using one of the combinations of Legrand products detailed in the sub-sections below. If the specific Legrand models are not available, a local solution can be deployed if the Contractor adheres to the following:

- a) If the selected products are Legrand, the Contractor must submit the specification sheets to DAFTD for approval prior to procurement/installation.
- b) If the selected products are not Legrand, the Contractor must submit the specification sheets along with a sample to DFATD for inspection/approval.
- c) The number and type of plugs requested in the design is respected.
- d) The products are certified at a similar level (CAT6, USB 3.0). All RJ45 plugs must be certified CAT6. Every plug supplied must be inspected and tested by a Canadian security representative.
- e) All locally supplied RJ45 plugs, boxes, and frames must be on site (even if not installed) for a Canadian inspection a minimum of 3 months prior to project completion date.

1.2.1 Voice/Data Outlets in Wall

Voice/Data wall outlets must be flush with the wall and 400mm from the floor (to center) unless otherwise specified. Voice/Data wall outlets must be Legrand Mosaic products or DFATD approved equivalent.

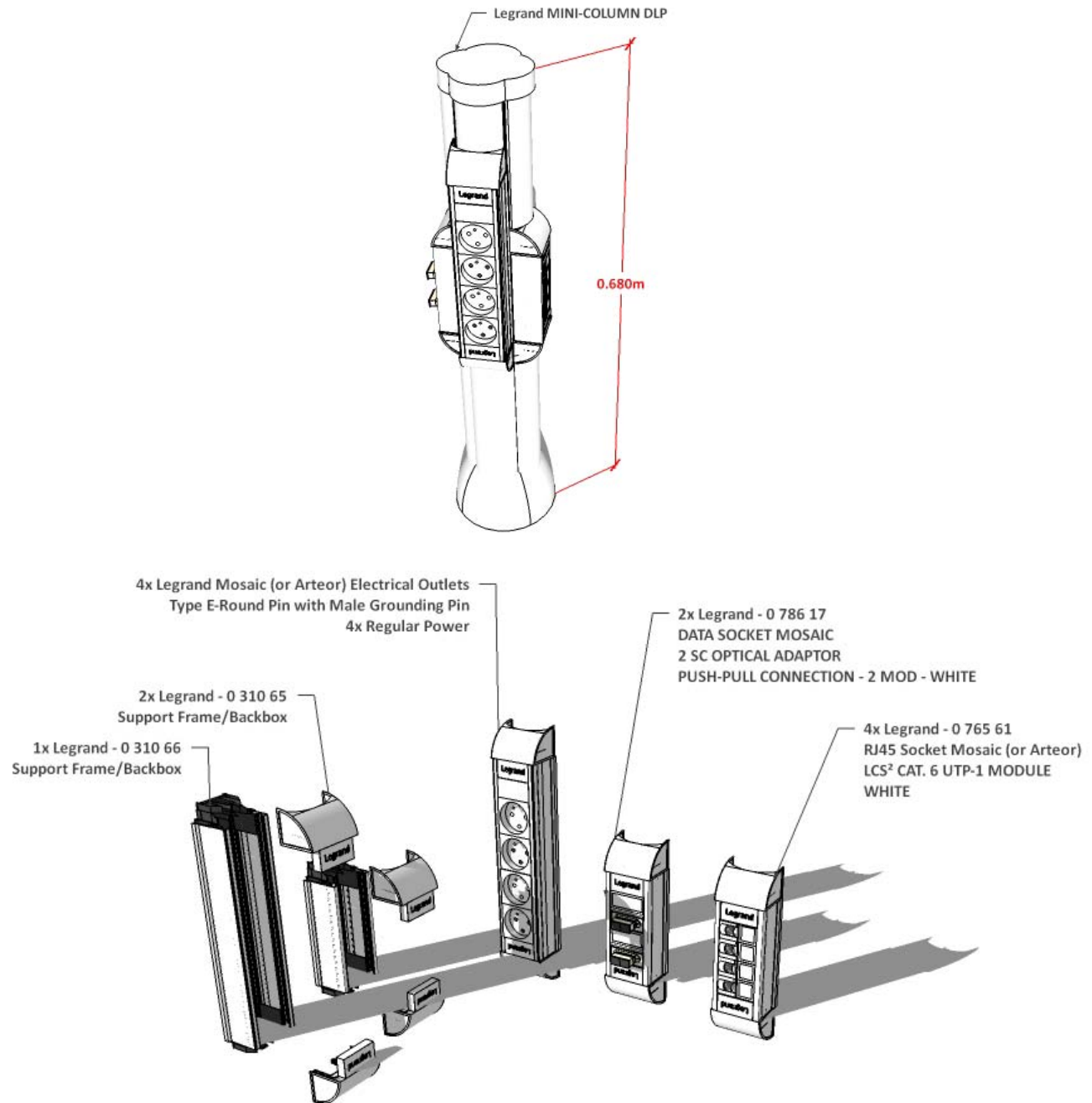
Figure 5 - Voice/Data Outlet In-Wall Box Detail



1.2.2 Voice/Data Mini-Columns for use in Open Offices

Unless otherwise specified, voice/data services for workstations in an open office must be supplied via mini-columns installed under each desk. Voice/Data mini-columns must be Legrand Mosaic products or DFATD approved equivalent.

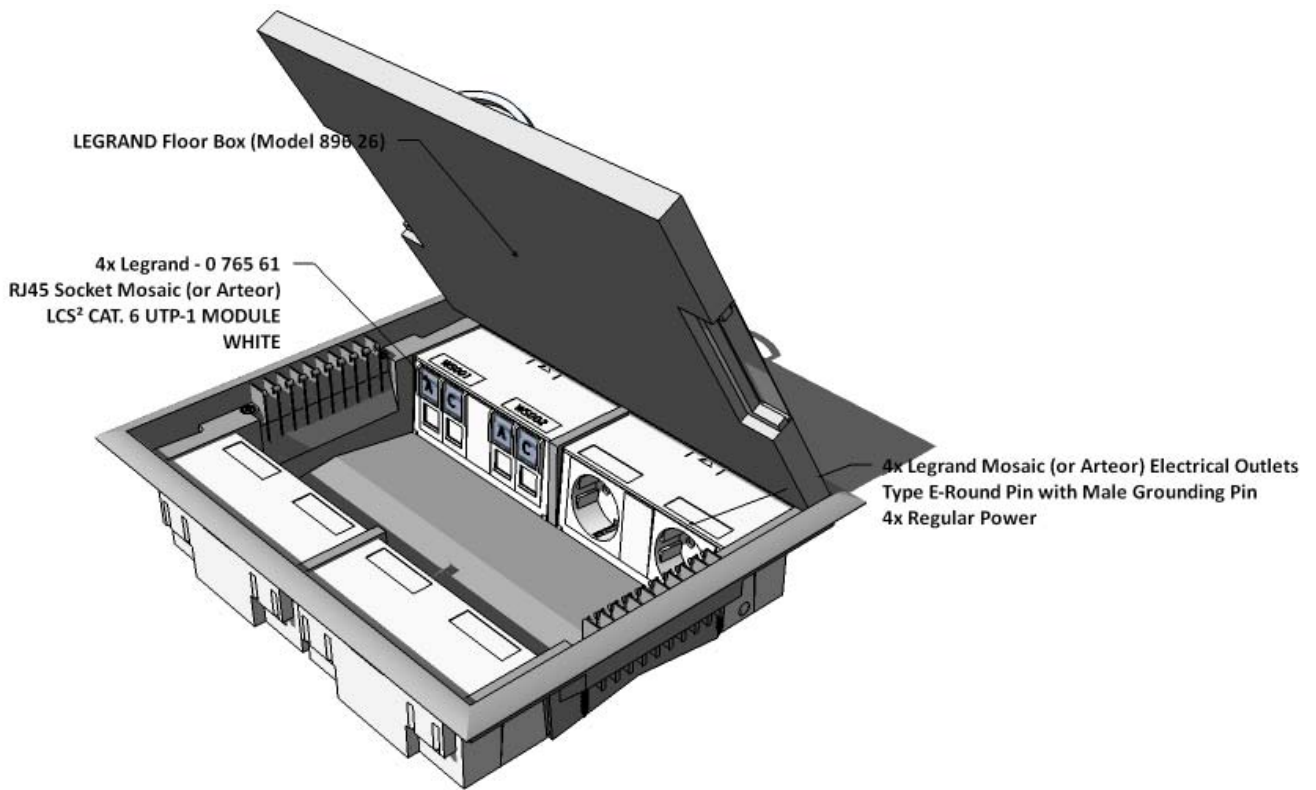
Figure 6 - Voice/Data Mini-Column for Open Office



1.2.3 Voice/Data Floor Box (Conference/Meeting Rooms)

Unless otherwise specified, voice/data outlets in the floor for meeting and/or conference rooms must use floor boxes. Floor boxes must be Legrand Mosaic products or DFATD approved equivalent.

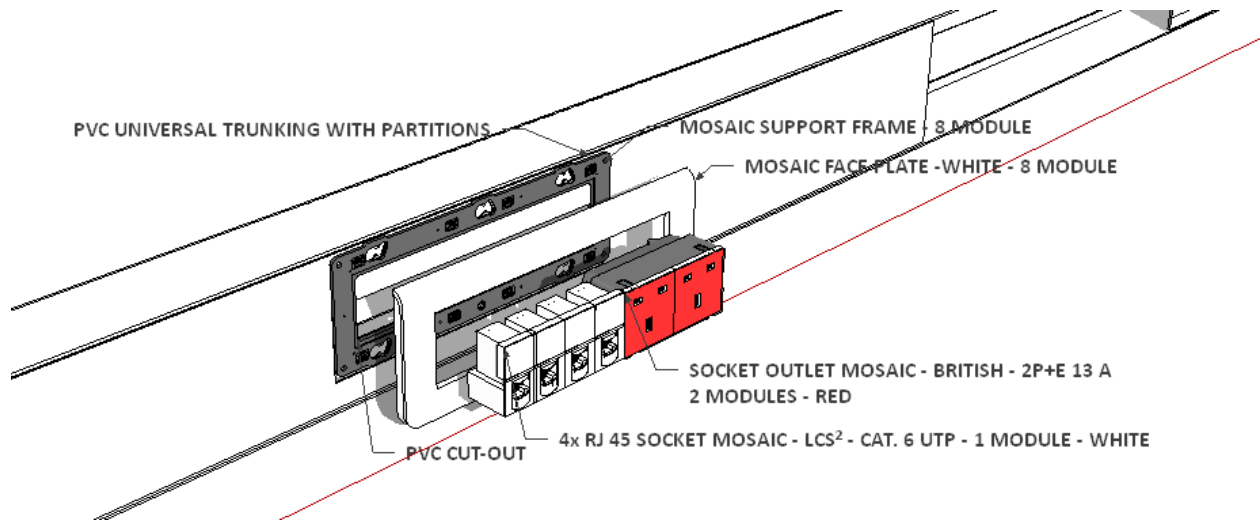
Figure 7 - Voice/Data Floor Box (Meeting Room)



1.2.4 Voice/Data in Skirting

Unless otherwise specified, voice/data services for workstations in an open office must be supplied via PVC Universal Trunking with Partitions at each desk. Voice/Data modules must be Legrand Mosaic products or DFATD approved equivalent..

Figure 8 - Voice/Data Outlets with Skirting



2. Fit-up of ICT & Multimedia Rooms

2.1 Designated Computer Center (DCC)

2.1.1 Size:

A 12 m² (130 ft²) space is required to accommodate Designated ICT communications equipment, UPS and file servers for other corporate computer systems (Figure 9).

2.1.2 Location

Operational Zone, preferably within the interior of the building with no exterior window exposure.

2.1.3 Construction

No suspended ceiling; normal office lighting; resilient static-dissipative vinyl flooring. Access to this room must be from the hallway through a 900mm (36") lockable IDACS controlled solid-core wood door.

2.1.4 Mechanical

Refer to [Part 4 - Mechanical System Requirements](#).

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2.1.5 Electrical

Refer to Part 5 - Electrical System Requirements.

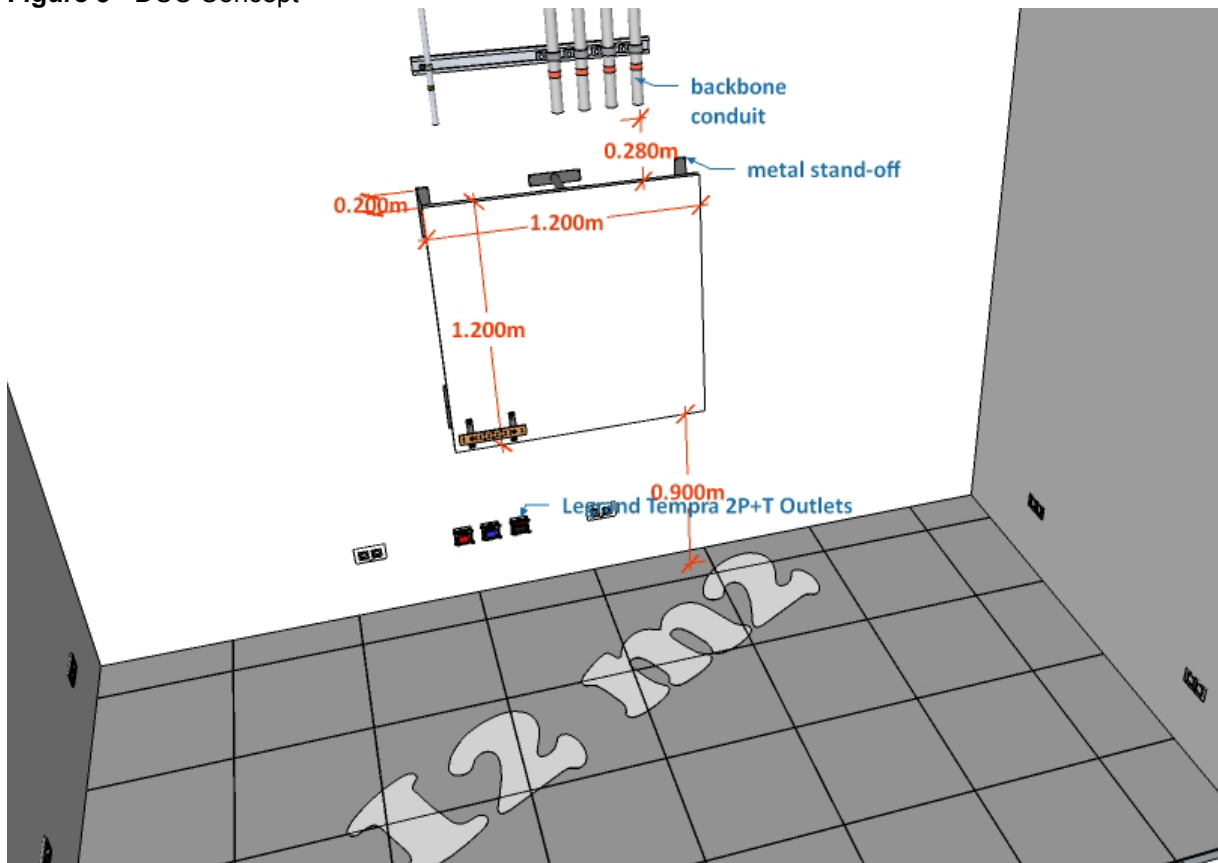
2.1.6 Other Works

- a) Millwork required: Plywood backboard painted in flat gray flame retardant paint. The backboard must have a thickness of 20mm; width of 1200mm; height of 1200mm. The backboard must be installed centrally on a wall 900mm from the finished floor. The backboard must have 4x metal stand-offs that will extrude the backboard 200mm off the wall.
- b) Metal “C” channel is required above and below the backboard in order to support the backbone conduit and ladder system.
- c) All Metal backbone conduits terminating in this room should be finished 280mm above or below the backboard on the “C” channel with a plastic bushing. Section 1.2 Raceways mentions, in the second bullet, that “All conduit used must be color coded as outlined in:

Part 5 – Electrical Engineering
A) GENERAL
9. Identification

- d) The following backbone conduit (threaded steel EMT) are required in the DCC:
 - 1x 50mm conduit to MSR backboard
 - 1x 50mm conduit to **each** TC backboard

Figure 9 - DCC Concept



2.2 Demarcation Point (DP)

2.2.1 Size

A 9 m² (3 m x 3 m) room to terminate incoming central office trunks or any other data services required by the mission (

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Figure 10).

2.2.2 Location

In the Public or Operational Zone of the Mission (preferably public); close to an exterior wall and/or in the basement of the building allowing easy entry of cables and/or conduits.

2.2.3 Construction

No suspended ceiling; normal office lighting; resilient static-dissipative vinyl flooring. Access through a lockable solid core wood door with access controlled by the mission.

2.2.4 Mechanical

Refer to Part 4 - Mechanical System Requirements.

2.2.5 Electrical

Refer to Part 5 - Electrical System Requirements.

2.2.6 Other Works

a) Millwork required: 2x Plywood backboards are required:

- Backboard (1) - painted in flat gray flame retardant paint. The backboard must have a thickness of 20mm; width of 1200mm; height of 1800mm. The backboard must be installed centrally on a wall 600mm from the finished floor. The backboard must have 4x metal stand-offs that will extrude the backboard 200mm off the wall.
- Backboard (2) - painted in flat gray flame retardant paint. The backboard must have a thickness of 20mm; width of 1000mm; height of 1800mm. The backboard must be installed on a wall adjacent to backboard (1); 600mm from the finished floor. The backboard must be installed flush on the wall.

b) Metal “C” channel is required above and below the Backboard in order to support the backbone conduit and ladder system.

c) All backbone conduits terminating in this room should be finished 280mm above or below the backboard on the “C” channel with a plastic bushing. Section 1.2 Raceways mentions, in the second bullet, that “All conduit used must be color coded as outlined in:

Part 5 – Electrical Engineering

A) GENERAL

9. Identification

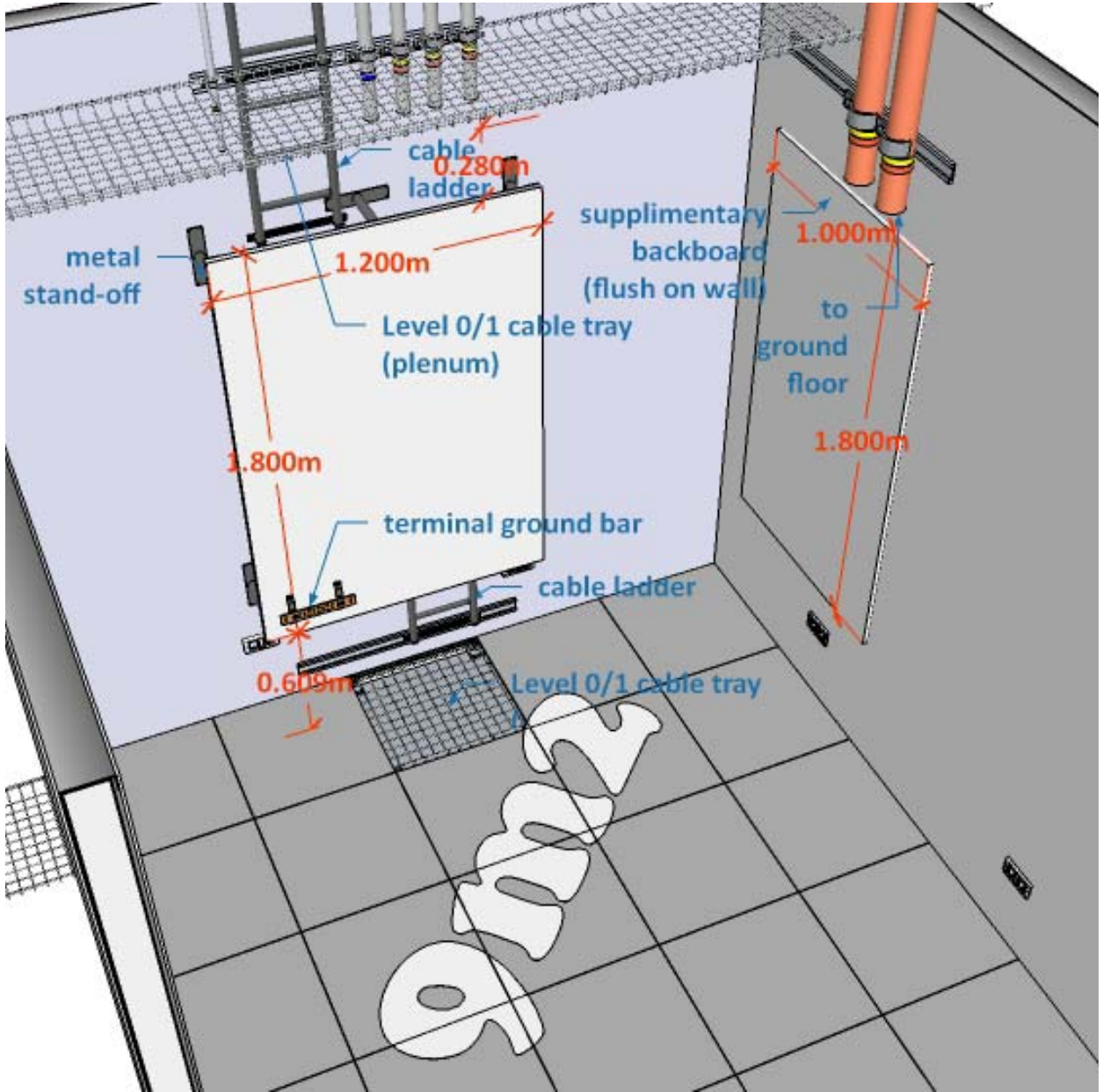
d) The following backbone conduit (threaded steel EMT) are required in the DP:

- 2x 100mm PVC conduit to MPR AV room (on ground floor)
- 1x 50mm conduit to **each** TC backboard

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- 2x 50mm conduit to MSR backboard

Figure 10 - DP Concept



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2.3 Telecommunication Closet (TC)

2.3.1 Size

A 2.0 m² (2m x 1m) space must accommodate cross-connect fields for voice/data UTP cable, fiber optic backbone cabling, IDACS backbone conduit and ICT equipment (Figure 11).

2.3.2 Location

Usually one located per floor, per zone (not including HSZ and PS). The TCs must be installed in a stacked formation where possible.

2.3.3 Construction

No suspended ceiling; normal office lighting; resilient static-dissipative vinyl flooring. Access to the TC must be through double, lockable, solid core wood doors opening outwards. No plumbing, mechanical or electrical construction must transverse this space.

2.3.4 Mechanical

Refer to Part 4 - Mechanical System Requirements.

2.3.5 Electrical

Refer to Part 5 - Electrical System Requirements.

2.3.6 Other Works

a) Millwork required: 2x Plywood backboards are required:

- Backboard (1) - painted in flat gray flame retardant paint. The backboard must have a thickness of 20mm; width of 1200mm; height of 1800mm. The backboard must be installed centrally on a wall 600mm from the finished floor. The backboard must have 4x metal stand-offs that will extrude the backboard 200mm off the wall.
- Backboard (2) - painted in flat gray flame retardant paint. The backboard must have a thickness of 20mm; width of 800mm; height of 1800mm. The backboard must be installed centrally on a wall 600mm from the finished floor. The backboard must be installed flush on the wall.

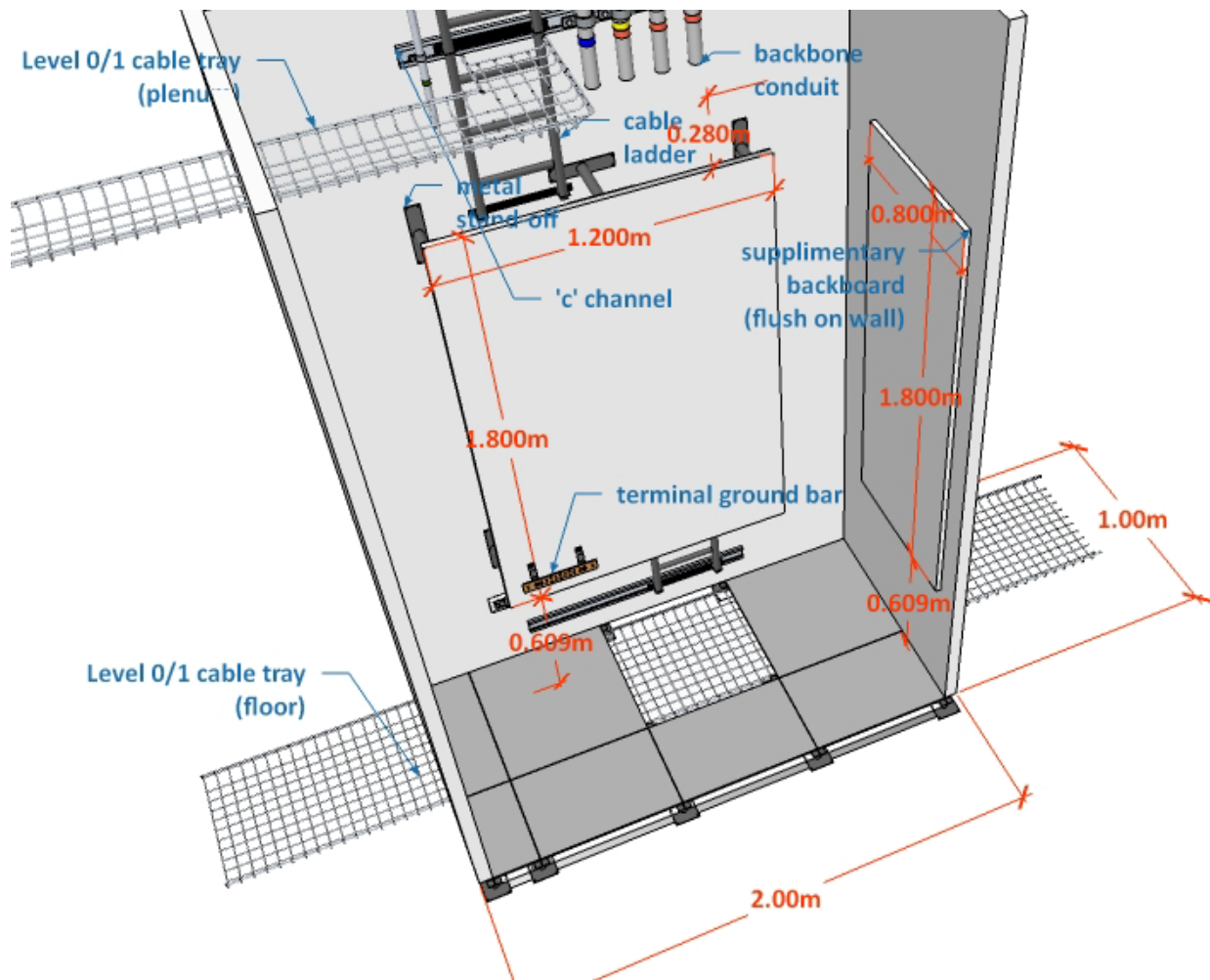
b) Metal “C” channel is required above and below Backboard (1) in order to support the backbone conduit and ladder system.

c) All Metal backbone conduits terminating in this room should be finished 11” above or below Backboard (1) on the “C” channel with a plastic bushing. Section 1.2 Raceways mentions, in the second bullet, that “All conduit used must be color coded as outlined in:

Part 5 – Electrical Engineering
A) GENERAL
9. Identification

- d) Wall hung ladder is required above and below Backboard (1) to support cable from raceways from plenum/floor.
- e) The following backbone conduit (threaded steel EMT) are required in the TC:
- 1x 50mm conduit to DP backboard
 - 1x 50mm conduit to MSR backboard
 - 1x 50mm conduit to DCC backboard

Figure 11 - TC Concept



2.4 Meeting Room with Video Conferencing (VCNet)

2.4.1 Size

The meeting room should be roughly 25m2.

2.4.2 Location

To be determined and as needed. Refer to blocking diagram.

2.4.3 Construction

No special considerations detailed in this section.

2.4.4 Mechanical

Refer to Part 4 - Mechanical System Requirements.

2.4.5 Electrical

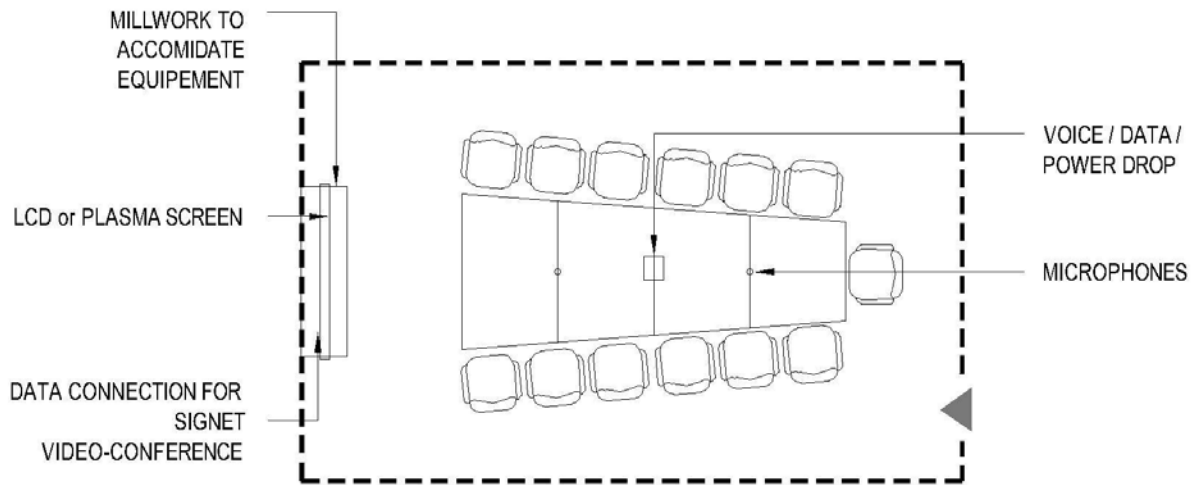
Refer to Part 5 - Electrical System Requirements.

2.4.6 Other Works

Provide multimedia backbone for audio/video fit-up as per Figure 12 and 13.

Figure 14

Figure 12- Meeting Room with Video Conferencing Layout



2.5 Meeting Room

2.5.1 Size

The meeting room should be roughly 20m².

2.5.2 Location

To be determined and as needed. Refer to blocking diagram

2.5.3 Construction

No special considerations detailed in this section.

2.5.4 Mechanical

Refer to Part 4 - Mechanical System Requirements.

2.5.5 Electrical

Refer to Part 5 - Electrical System Requirements.

2.5.6 Other Works

Provide multimedia backbone for audio/video fit-up as per Figure 14 and Figure 15.

Figure 1413 - Proposed Meeting Room Layout

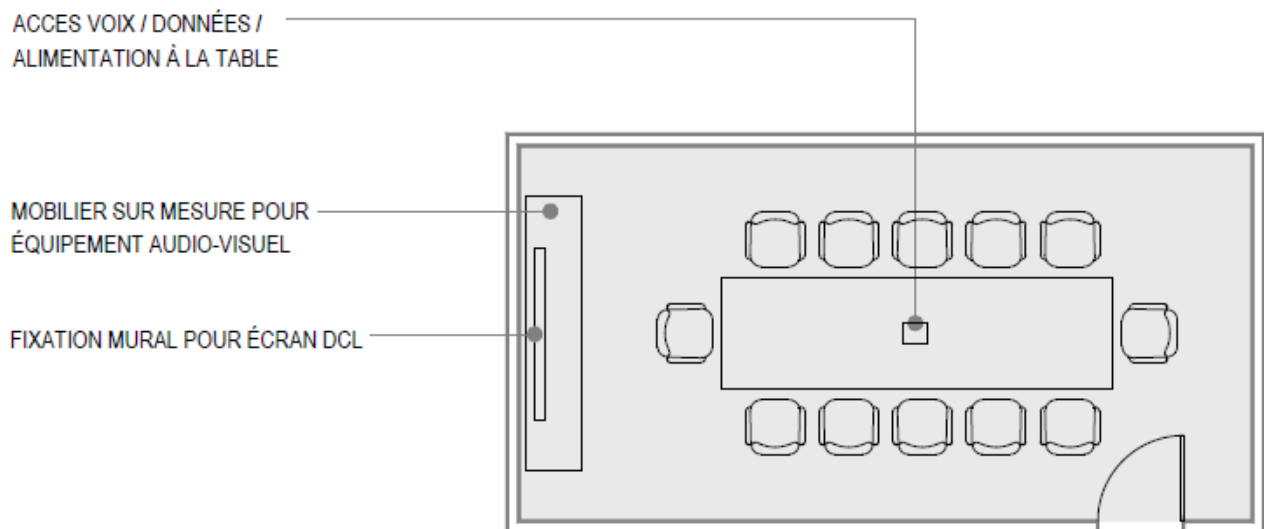
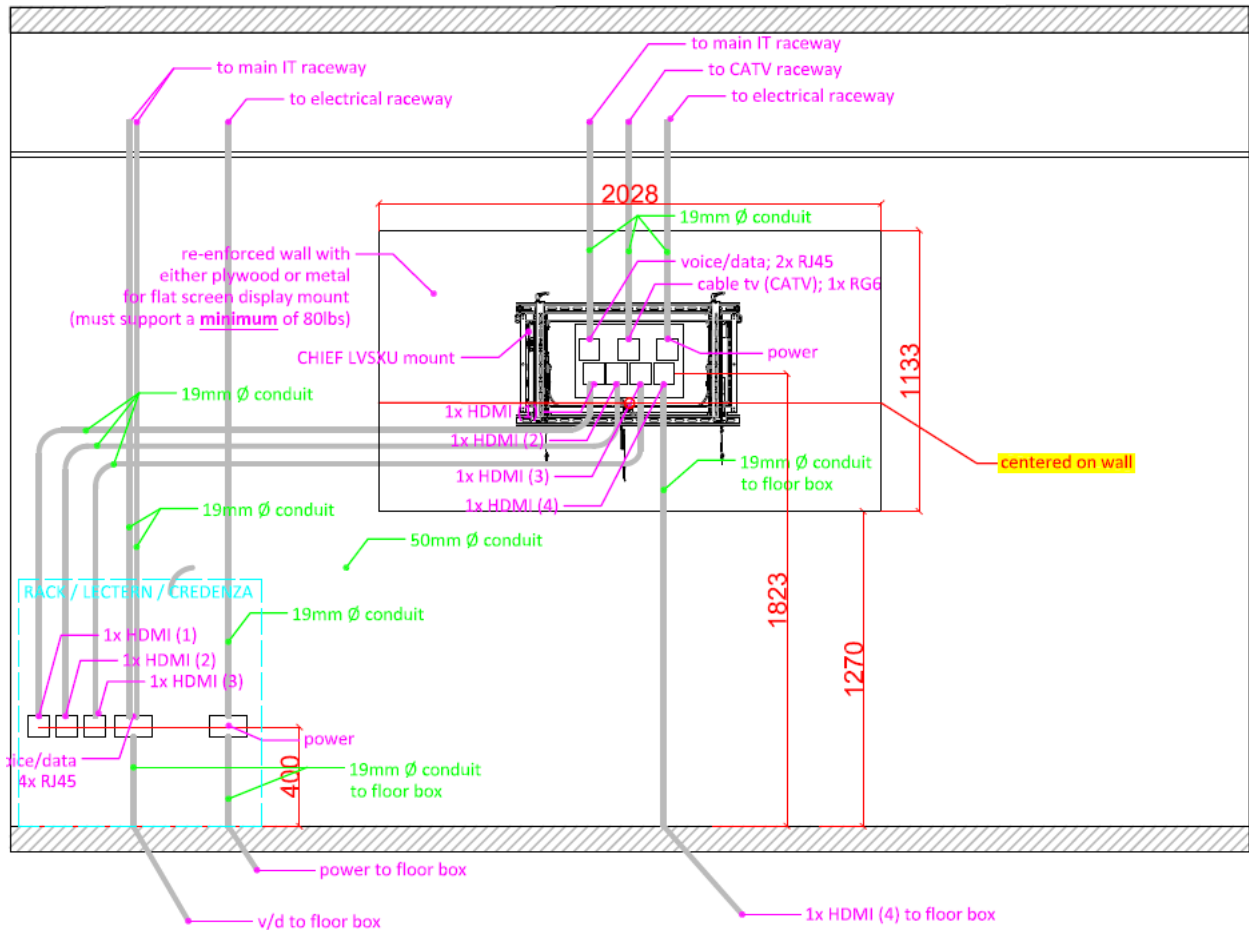


Figure 145 - Proposed Meeting Room - Feature Wall Design



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2.6 Multi-Purpose Room (MPR)

2.6.1 Size

A flexible representational space measuring roughly 50m². Room has multiple furniture set ups to suit medium scale business and social functions which include trade delegations, media releases, conferences, public meetings and cultural events, training sessions and luncheons.

2.6.2 Location

Located in the Public Zone in a prime location with a feature view.

2.6.3 Construction

Audio/Video Fit-up

The Contractor must provide (supply and install) a complete audio/video fit-up for the MPR. The fit-up must be based on the following functionality requirements:

- a) The Meeting Room can be setup in various configurations.
- b) The Meeting Room must be equipped with AV equipment and have VTC capabilities.
- c) The Meeting Rooms AV/ VTC equipment must be managed by a single control system with several touch panels.
- d) The room must be furnished with several tables accommodating up to sixteen (16) participants
- e) 4x floor box under the tables must house the DFATD departmental network.
- f) The networks must be extended to an access enclosure embedded into the table allowing users to bring their laptops into the room and connecting them via Ethernet cable.
- g) A signal path is required from the access enclosure to the equipment rack and from the equipment rack to the display.

Sources

- a) IP-based videoconferencing system operating on a standalone network.
- b) IPTV from the local provider.
- c) A standalone PC. Keyboard and mouse must be controlled via a Fiber USB transmitter/receiver.
- d) The video and audio content of a departmental laptop connected via the access enclosure in the table. It is recommended that the laptops have an HDMI or Display Port output.

Destinations

- a) The IP-based videoconferencing system allowing presentation content to be transmitted during unclassified videoconferences.
- b) One 70-inch displays, for VTC and presentation purposes, will be located along an inside wall.
- c) For detailed viewing (i.e., with clues), the smallest recommended display should have an image height of 24.0 inches (610mm).
- d) For inspection viewing (i.e., without clues), the smallest recommended display should have an image height of 36.0 inches (914mm).

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Functional Requirements

Video:

- a) The displays must have a 16:9 screen format and be capable of supporting resolutions up to 1,920 x 1,080p @ 60Hz.
- b) High resolution computer-video content from laptops must be displayable onto the displays.
- c) Laptops must be connected to an access enclosure in the table via an HDMI to HDMI, DisplayPort to HDMI, or VGA to VGA cable.
- d) The video signal of departmental laptops can be sent to any display in meeting room.
- e) The design must allow sources of varying resolutions, horizontal and vertical frequencies, and aspect ratios to be scaled to a common HD resolution seamlessly.

Audio:

- a) Hi fidelity audio from the laptops must be distributed via an audio system (speaker locations TBD).
- b) Laptops must be connected to the access enclosure via an HDMI to HDMI, DisplayPort to HDMI, or stereo 3.5mm cable.
- c) Hi fidelity audio from the one audio input must be distributed to the audio system.
- d) The lecterns and tables must be fitted with a surface-mounted microphone, which must be used during unclassified videoconferences or briefings.

Control:

- a) Control of the AV/VTC system in meeting room must be achieved via a color touch panel located on the tables or lecterns.
- b) The touch panels will allow users to initiate unclassified videoconferences or briefings as well as display departmental laptop content.
- c) The touch panels will allow users to control room lighting.
- d) The touch panels will allow users to control room motorized window treatments.

Support

The Contractor must provide a full service support contract on the A/V fit-up that includes, but may not be limited to the following:

- a) A three year warranty on the installation. This includes equipment, as well as the installation. There must be no charge for any new equipment or labour within the contract term.
- b) In the event a repair is required, a technician must be deployed within 48hrs of diagnosis.
- c) Technical support via telephone is available during normal working hours.
- d) The support contract should be renewable at the end of the term (and price re-negotiated).

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2.6.4 Mechanical

Refer to Part 4 – Mechanical System Requirements.

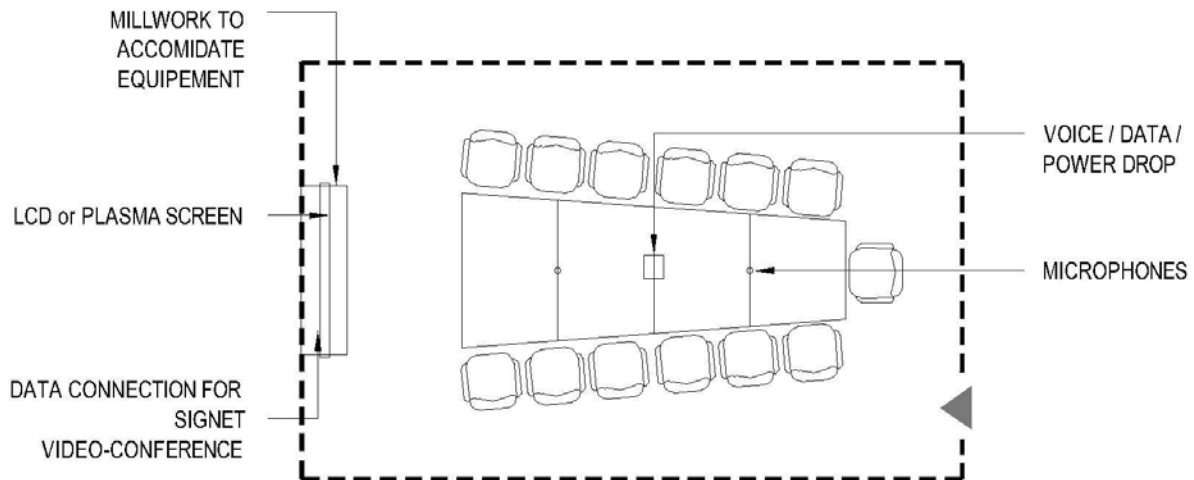
2.6.5 Electrical

Refer to Part 5 - Electrical System Requirements.

2.6.6 Other Works

No special considerations detailed in this section.

Figure 156 - Meeting Room with Video Conferencing Layout



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D) SERVICES

1. Telephone Service

1.1 The Government of Canada is responsible to supply and install the voice networking system including the Private Branch Exchange (PBX), associated hardware and internal wiring.

2. Internet/Data Service

2.1 The Government of Canada supplies, installs and maintains its own secure Global Network (SIGNET) Communications System. The department is responsible to supply and install (SIGNET) equipment and associated internal cabling. This system shares the same conduit network infrastructure with the Consulate\Embassy telephone (voice) networking system (MITNET).

Chancery Consolidation Abidjan, Côte d'Ivoire

Commissioning

Part 8

Commissioning Requirements

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PART 8 – COMMISSIONING REQUIREMENTS

A) COMMISSIONING (Cx)

1. General

- 1.1 Commissioning is a process that takes place at all stage of the project. At concept / design stages Cx activities serve to assure that the Owner’s Project Requirements for items such as energy efficiency, sustainability, indoor environmental quality, fire protection & life safety, etc. are sufficiently defined and adequately & accurately reflected in the contract documents. It provides the opportunity to assure that building systems and assemblies as designed will function according to user expectations.
- 1.2 The consultant is responsible to prepare the documentation for the commissioning process to be followed by the contractor. The process includes construction checklists develop with the intent to convey pertinent information to the installers regarding concerns on installation and long-term operation of the facility and systems. The approach to the structure of the checklists is to keep it short and simple by focusing on key elements. Checklists span the duration from when equipment is delivered to the job site until the point that the system/component is started up and operational. Construction checklists are tools for transferring the information contained in the contract documents (drawings and specifications) to the workers in the field. This includes testing, adjusting and balancing and control system tuning.
- 1.3 At the construction stage, the consultant must supervise the installation of the equipment, material and systems, and witness the commissioning performed by the contractor and the independent certification firm when required. The two overarching goals of the Construction Phase are to assure the level of quality desired and to assure the requirements of the contracts are met.

2. Fire protection and life safety systems SOW

- 2.1 The Fire protection and life safety systems certification must be performed by a specialized Audit and Certification firm independent of both by contract and employment from the A/E team. This requirement must be in the specification as for the cost to hire this firm is the contractor responsibility.
- 2.2 Within the tender document’s specification, the consultant must identify the process, procedures, methods and documentation for each phase of the Cx process and describe the requirement of the verification and testing to be performed by the contractor.
- 2.3 Once the contractor installation, initial verification and testing is completed, the certification and audit firm must proceed with their audit and certification of all fire protection and life safety systems. The audit firm must prepare a written report detailing the steps of all the verifications performed and a brief description of the process and instrumentation used and the result of the certification.

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2.4 The completed Cx plan and certification, including all appendices must form part of the Cx record turned over at the end of the construction phase. All active and passive (components installed in the floors and walls and the doors rating and operation) fire protection and life safety systems must be Cx.

3. Electrical infrastructure

- 3.1 The Electrical infrastructure certification must be performed by a specialized Audit and Certification firm independent of both by contract and employment from the A/E team. This requirement must be in the specification as for the cost to hire this firm is the contractor responsibility.
- 3.2 Within the tender document's specification, the consultant must identify the process, procedures, methods and documentation for each phase of the Cx process and describe the requirement of the verification and testing to be performed by the contractor.
- 3.3 Once the contractor installation, initial verification and testing is completed, the certification and audit firm must proceed with their audit and certification of all electrical installation. The audit firm must prepare a written report detailing the steps of all the verification performed and a brief description of the process and instrumentation used and the results of certification.
- 3.4 The completed Cx plan and certification, including all appendices must form part of the Cx records turned over at the end of the construction phase.

4. Mechanical system

- 4.1 The Cx Process for all mechanical systems consists of complete testing, adjustment and verifications of all the new mechanical installations and also a confirmation of the integration of the functionality with the existing systems.
- 4.2 The completed Cx plan and certification, including all appendices must form part of the Cx records turned over at the end of the construction phase.

5. O&M manuals

- 5.1 The manual must include: as-built drawings, equipment data, model numbers for the equipment, parts lists, equipment options, operating manuals for each piece of equipment, sequence of operation testing and balancing reports and certifications, maintenance schedules, videos, and warranty schedules. The manual must be reviewed and certified complete by the project manager before submission to the facilities manager.
- 5.2 Manuals must be provided in English and in electronic format and two (2) hard copies.

6. As Built Drawings

6.1 As-built drawings must be provided at completion of the project and must reflect all changes made in the working drawings during the construction process. They must show the exact dimensions geometry and location of all elements of the work completed under this contract.

7. Training

7.1 Within the tender document's specification, the consultant must identify the training requirements that the contractor is responsible to provide.

7.2 For each system installed, training must be provided to the property section describing the design objectives and how to operate the building. In addition of the information provided in the O&M manuals, the sequence of operation and the trouble shooting guide must be provided and posted close to the system if possible.

8. Spare parts

8.1 The consultant must include a list of spare parts within the specifications that the contractor is responsible to provide at the end of the project. For each system installed and in addition to the final operating set, provide spare parts that are routinely changed as part of the maintenance program that may cause an interruption in the operation if not readily available.

9. Systems to be commissioned

9.1 The systems to be commissioned must include but not limited to the following:

System / Equipment / Process Description	Description of Cx activities (provided by Contractor)
MECHANICAL	
Potable Water Piping distribution system including the separation from the other floors.	
Water treatment	
Sanitary Sewage system	
Ductwork	
Hot water tank	
Washroom accessories - Urinal Flushing valves, thermostatic valves	
Main Air Handling Units / Variable speed drives including cooling system	
HVAC Controls – field device calibration / programming – sequence of operations verification	
Outdoor air Fans / Variable speed drives	
Independent air conditioning unit	

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System / Equipment / Process Description	Description of Cx activities (provided by Contractor)
Exhaust Air Fans	
Room Transfer Fans	
Testing and Balancing (TAB) of all fluid and air delivering systems.	
Kitchen Equipment	
Fuel distribution if modifications are required	
ELECTRICAL	
Distribution/sub distribution boards including circuit breakers	
Grounding and Bonding	
Cables, Low Voltage 1kv Max	
Outlets	
Switches and cut-outs	
Lighting Control system	
General Light Fixtures	
Transfer switch	
Generator and emergency power	
LIFE SAFETY SYSTEMS	
Exit Lights	
Emergency Lights	
Fire Alarm/detection System	
Fire/ Smoke Dampers – operation and accessibility	
Door hardware	