SAINT VINCENT AND THE GRENADINES HALLS OF JUSTICE PROJECT

Architectural Design Competition Process

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This Annex records the format, roles, process, conditions, and submission requirements of the Saint Vincent and the Grenadines Halls of Justice (HoJ) Architectural Design Competition. The purpose of the competition is to select, on the basis of a comparison of designs submitted, a consultant architect and design for a Halls of Justice Building for the people of Saint Vincent and The Grenadines that is:

modern, functional and cost effective, reflects Saint Vincent and the Grenadines legal traditions, recognizes Kingstown's architectural heritage, has a "Green" environmental footprint and is a landmark building.

1 TYPE OF COMPETITION

The Competition will be a **project competition** with the intention that it lead directly to the construction of the project. The objective in holding the competition is to select the best design and architect for the project.

The competition will be a single-**stage competition (except as noted in section 3.7),** where selected architects will prepare concept designs based on the Design Brief. The brief will be provided separately to each of the Competitors. The Competitors will be required to submit a fee proposal with their competition entry.

2 ROLES & RESPONSIBILITIES

The **Client** will be the Government of Saint Vincent and The Grenadines (GoSVG). The Client will be responsible for:

• preparing the design brief and cost limitation (See attachment 1)
• preparing the site survey in electronic format

• scheduling the order of events
• selecting the jury
• ensuring the competition conditions reach the competitors
• displaying the entries for jurors
• returning or disposing of the entries (as applicable)
• abiding by the jury's decision

The client will appoint a **Competition Advisor** to manage the competition process.
The CA will be responsible for planning, organizing and running the competition including issuing the Architectural Brief electronically to all prequalified architectural consultancies and answering queries during the preparation of the architectural designs. The CA will be impartial and will ensure that the competition is managed objectively with the welfare of all participants in mind. The CA will be present from the close of submissions and during the judging process to advise and support the judging panel. The CA will not be one of the judges.

The Competition Advisor is:
Name: TBA
Email: TBA
Phone: TBA
Cell: TBA
Fax TBA

The role of the **Competitor** is to meet their professional responsibilities by acknowledging the competition rules in any design they prepare, in particular by respecting the budget and program requirements for the competition and the client's design intent as indicated in the Architect's Brief. Competitors must respect confidentiality requirements and restrictions regarding media statements or comments contained in the competition rules. Competitors must not attempt to contact the client, or any member of the jury. All enquiries must be directed to the nominated Competition Advisor.

3 THE PROCESS

3.1 Closing Date

18th April, 2023

3.2 Registration fee

There will be no registration fee

3.3 Site Visit

It is recommended that all Competitors visit the site. The Competitor shall arrange and pay for such visits with the knowledge and approval of the client.

3.4 Questions and Answers

The competition rules allow competitors to ask questions prior to the date specified in the next section. Competitors should send their questions to the CA by email. This date has been set to allow enough time for answers to questions to be provided in time for all competitors to incorporate the information into their submissions. The CA will supply answers to all questions to all competitors as soon as possible after the closing date for questions. The objective of the question and answer exercise is to clarify competition conditions, while providing all competitors with information that is as accurate as possible.

3.5 Display of entries

The client will provide appropriate display space for judging that is comfortable, well lit, secure and large enough to accommodate the expected number of submissions.

3.6 Checking for Compliance

The client and the CA will prepare a checklist to confirm that all entries comply with the competition rules. If a mandatory requirement (as indicated in the Architect's Brief) is not satisfied, the design will be marked accordingly, noting the shortcoming. If a competitor exceeds the submission requirements by submitting, for example a model, extra drawings or other information, these will not be considered by the jury.

3.7 Evaluation by the Jury

The winning design will be the design that in the Jury's opinion best addresses the Design Brief. The selection of winners will be made by a progressive elimination of entries. After the field is reduced to a short list of potential prize winners, a detailed examination of the remaining designs will be made, the strengths and weaknesses compared and the workability and affordability of the intended design confirmed. When all issues have been thoroughly discussed, the jury will select the first prize design and rank the remaining designs.

In the circumstance where the jury decides that none of the submissions meet the expectations of the client, they may recommend that (a) no first prize be awarded (b) that the top designs enter a second stage (c) a new competition be staged or (d) the competition approach be terminated.

3.8 Exhibitions

At the discretion of the Client, a public exhibition of the competitors' drawings may be held.

3.9 Returning of submissions and drawings

Shortly after the awards are announced and after post-competition exhibitions are held, the client will allow for the design submissions to be collected by competitors.

4 THE COMPETITION CONDITIONS

4.1 Competition Documents

The competition documents consist of this document and the Design Brief which will be provided separately to each of the competitors. The Design Brief includes:

• space requirements, accommodation relationships and all other technical details

• the client's design objectives and criteria

• information about the site

• the budget

4.2 Copyright

Competitors retain copyright to their entries. The client may make certain uses of the work submitted including photographic or other recording of the submissions for archival and publicity purposes.

4.3 Program

For submission of questions to the CA: TBA

Design submissions must be received by: TBA

Announcement of Competition results: TBA

4.4 Lodging Submissions

Design submissions must be lodged at: TBA

It is the competitor's responsibility to wrap and ship design submissions so that they arrive intact and on time. The client disclaims any responsibility for loss or damage of designs in transit. The entries will be stored in a secure place. After announcement of the winner(s) the client may keep all entries for as long as it deems necessary. Competitors are advised to make copies of their submissions before dispatch so that they will have a record of their work.

4.5 Disqualification

Competitors may be disqualified for any of the following reasons.

(i) Late submission
(ii) Verbal, written or electronic communication with any of the jury panel. All communication must be through the Competition Advisor cc to the Permanent Secretary of the Ministry of Urban Development
(iii) Total disregard for the design brief

Should there be any doubt regarding a submission, the CA will seek the advice of the Jury Chair, Chairman and secretary of the Central Procurement Board and the Director of Projects.

4.6 Jury's Report

The competition rules require the jury to write a report explaining its reasons for selecting the top ranked design and ranking the other prize-winning designs, including any honorable mentions. A copy of the jury report will be provided to each competitor and be published.

The Jury's report will have three basic functions:

1. written evidence to competitors, the client and the public that the evaluation and selection procedures were executed with fairness and care, thus conferring legitimacy on the prize-winning designs.

2. an educational document that describes the criteria for evaluating the design.

3. an historic document that lists the winners and explains why specific designs were chosen.

4.7 Authority of the Jury

The Competitors will be bound by the jury's decision.

4.8 Awards

The following prizes will apply to this project, excluding VAT.

• First prize: US$ 30,000

• Second Prize: US$ 15,000

• Third Prize: US$ 5,000

• All other competitors: US$2,000

The winner will be given the 1st prize money and if the project proceeds with the winning architect as the project designer and construction supervisor, this becomes part of the Consultant's fee.

In the event that no first prize is awarded in the first stage (see section 3.7), the prize money will be awarded in the second stage to those who so qualify. The rest of the prize money will be awarded to the remaining shortlisted competitors upon the conclusion of stage one.

4.9 Disclaimer

By entering the competition, the Competitor accepts that the decision by the Jury is final and cannot be questioned or disputed by any of the competitors.

4.10 Appointment of Architect

There is no guarantee that the top ranked competitor will be offered a commission by the client for the completion of the project.

The client/consultant agreement will be a standard Caribbean Development Bank (CDB) Large Lump Sum Agreement. The fees shall be negotiated and agreed based on the fee proposal submitted with the Competition Design and the fees considered acceptable in the region for similar projects. The Consultant's Project Architect will be appointed the Project Manager in the Works Contract to undertake the day-to-day contract administration on behalf of the GoSVG including the validation of the building contractor's and F&E supplier's progress claims.

5 THE SUBMISSION REQUIREMENTS

The design submission must be sufficient to explain the design without overelaborate or unnecessary drawings. Competitors are encouraged to concentrate on finding the best design solution rather than on its graphic presentation.

5.1 Drawings

- All drawings will be A3 size
- 12 x A3 drawings will be submitted as follows:

    1. Site Plan (appropriate scale)
    2. Ground Floor Plan (1:200)
    3. First Floor Plan (1:200)
    4. Second Floor Plan (?)
    5. Roof Plan (1:200)
    6. North and West Elevations (1:200)
    7. East and South Elevations (1:200)
    8. Cross sections (1:200)
    9. Cross section details
    10. Exterior Isometric
    11. Interior Isometric of Appeals Court Room
    12. Free sheet to be used at the designer's discretion

- A soft copy of the drawings on a flash drive, must also be submitted
- Models are not required and will not be accepted.
- Where sheet 4 is not used (building is only two stories), the consultant may use this as an additional free sheet at his discretion

5.2 Written descriptions

Two additional A3 sheets (1 side only) comprising:

- A 'Design Narrative" describing a conceptual design approach to the project and a statement describing the design philosophy to the design problem.
- A preliminary schedule of materials & finishes shall be provided
- A preliminary cost estimate shall be provided
- A soft copy of the written submission on a flash drive, must also be submitted

5.3 Submission document

The completed submission, will comprise a set of bound coloured paper copies of the twelve (12) drawings, plus the 2 sheets of written descriptions. This will amount to fourteen (14) sheets per set. The competitor will be required to submit twelve (12) bound sets of fourteen (14) sheets.

5.4 Anonymity

Anonymity is to be protected. No reference is to be made to the identity of the submitting architect. Competitors are instructed to submit their designs double wrapped. When the exterior wrapping is removed, a plain wrapper with no markings should enclose the submission. Identification by the competitor is achieved by affixing an unmarked sealed envelope to the rear of the first drawing. The competitor should include within the envelope, a letter on a company letterhead. including:

(i) their name, address and telephone number
(ii) a lump sum fee proposal for completing the design
(iii) an A4 size copy of the front elevation of their building identical to the one submitted for jury consideration.

The envelope shall remain unopened in the possession of the Secretary to the Procurement Board. Upon the completion of the jury evaluation process and assignment of places, the envelopes shall be opened to reveal the winner.

5.5 Lump sum fee proposal

The total budget for the project including consultant fees, construction and procurement of Furniture and Equipment is fixed at **US$10 million** (excl VAT) The lump sum fee proposal is to be in XCD and is to be based on the scope of services described below and is to include a payment schedule based on outputs. (Note that there will be no escalation clause or advance payments and the exchange rate risk is to be borne by the consultant). The consultant will provide an indicative design and construction program. Note the requirement for a full time Clerk of Works and specifying, scheduling and commissioning of loose furniture and equipment.

6 SCOPE OF SERVICES FOR THE SELECTED SUPERVISING CONSULTANT

The competitor will have nominated a team of architects, engineers and quantity surveyors in their EOI submitted prior to the competition. The scope of services described below covers all three disciplines architectural, engineering (Civil, Structural and Building services) and quantity surveying.

The services will be delivered in two phases

1. Design Phase

2. Construction Phase

The consultant's fees need to be structured so that there would be no claim against the Client in the event that the construction phase does not proceed.

DESIGN PHASE

6.1: Development of the Concept design

The appointed architectural consultancy will refine the selected design and update the Architects Brief to accommodate any comments in the Jury Report or at subsequent discussions with the end users. The updated Architects Brief should include detail Room Data Sheets, a detailed services brief developed in conjunction with sustainability and maintenance considerations and a monitoring mechanism that will allow on-going monitoring and evaluation of design outcomes. The architect's Quantity Surveyor will confirm that the design can be constructed within the allocated budget and prepare a Concept Design Cost Plan. This may involve revisiting parts of the design so that costs can be reduced. The MOTW QS will independently check the consultant's concept design costings.

6.2. Design Development

Based on the final concept design approved by the GoSVG the architectural, engineering and quantity surveying consultants will conduct a "Value Management Workshop" that includes members of the HoJ Subcommittee and prepare Design Development Drawings, including a Design Development Cost Plan. (to be independently checked by the MOTW QS) and an analysis of Whole-of-life costings that will enable the HoJ Subcommittee to make informed decisions on issues surrounding long term maintenance and sustainability.

6.3. Tender Documentation

Following approval of the Design Development Drawings and Cost Plan by the HoJ Subcommittee, the consultants will prepare:

• Final Architectural construction drawings and specifications

• Structural and civil engineering construction drawings and specifications

• Services engineering construction drawings and specifications which include the input of a services engineer with “Green Design” expertise.

• Bills of Quantities and a Pre-Tender estimate that confirms that the designs are within the budget costs. (The MOTW Quantity Surveyor will independently check these estimates.) and Whole-of Life costings that will enable the GoG to budget for operation and maintenance in the out-years.

• Request for Tender documentation in accordance with Caribbean Development Bank (CDB) and FIDIC processes

- Submission of drawings to Physical Planning for approval

6.4 Qualification of construction contractors

The architectural consultancy will be responsible for the procuring of a builder to construct the Halls of Justice. Procurement will comprise a single stage tender process which will include a post qualification assessment.

CONSTRUCTION PHASE

Contract tendered, assessed and contractor appointed

6.5 ***Lump Sum Tender***: Bidders will prepare a Lump Sum tender based on the construction drawings, specifications and bills of quantities. The tenders submitted will be assessed by the Consultant who will prepare a Tender Report based on a “Value-for Money” assessment recommending a preferred tenderer. The Tender Report will be submitted to the Central Procurement Board (via the MOTW) for their consideration. The successful builder will enter into a FIDIC based construction contract with the GoSVG based on their lump sum tender.

6.6 Construction Contract Administration and Supervision

The Consultant will be the Project Manager responsible for administering the FIDIC based construction contract between the GoSVG and the builder. The consultant will be required to provide full time on-site supervision, contract administration, quality, budget and time control as well as project close out following the end of the maintenance period.

ATTACHMENT 1

DESIGN BRIEF FOR HALLS OF JUSTICE BUILDING

1.0 INTRODUCTION

The Feasibility study for the OECS Halls of Justice Project, was completed in 2011 with no progress towards designs, due to the high cost of the preliminary cost estimates. The Government of Saint Vincent secured a loan from the Republic of China on Taiwan in 2019 to further the development of this project. The project requirements have been scaled down significantly with the decision to re-purpose the historic Court House building to a full criminal court, significantly reducing the space requirements of the Halls of Justice (HoJ). This new HoJ building will now contain the Civil High Court, Court of Appeal and Registries.

2.0 SPACE PLANNING RATIONALE AND DETAILS

This section provides the details of the spaces and technical requirements to guide the design concepts for the proposed HoJ which will now contain The Civil Registry, The High Court Administration and The Civil Courts including the Court of Appeal.

The architectural design of spaces within the facility must take into account functionality, flow, amenities, and electrical, mechanical and technological requirements in order to meet the needs of the occupants and users of the building. Apart from these issues, sound and light control within spaces, including natural sunlight, are also important in the development of the architectural design. Described below are the requirements for different areas in the building, departments and users:

2.1 Parking

Secure parking must be provided for Judges, Masters, and Registrars. This should provide them with their private access to the building and to their segregated circulation. Registrars however must from this circulation, be able to connect to the interface zones in which they must work, through staff entrances to these zones.

Public parking should not be within the building, or so adjacent to the building, as to be a security risk. Special consideration must also be given to Senior Managers, the Court's vehicles and to the delivery and other service vehicles. The entrance and exit to the parking area should be equipped with automated gates and should have a vehicle barrier beyond the gate [holding area] to allow the guard to question persons before allowing further entry. The size of each parking spot should be approximately 160 SF each.

2.2 Entrance and Lobby

The main Court entrances will serve different groups of users including, the general public, visitors, witnesses, attorneys and staff. The main entrance should be double doors to accommodate large traffic flows, and access for the differently abled must be taken into consideration in the design. Aside from being an entrance foyer and the first introduction to the inside of the building, the court entrance lobby must also provide the public with quick direction to the various areas, which they must access.

At the entrance, all users must be screened. This requires both body scanning and baggage scanning. There should also be space so that persons who should subsequently be close scanned can be searched with hand scanners without disrupting the general scanning process. Having been scanned and permitted entry, the user should find himself in the Court's buildings main lobby. The lobby will serve as the "public face" of the building and the character and functions of the lobby space will influence the Court customer's first impression of the building. Key design concerns for this space include balancing aesthetics, security, and operational considerations. The lobby is meant to welcome visitors, control access, and provide exit ways from the building. Many members of the public entering a court building are first time users and are intimidated by the prospect of going to court. This area should allow a stranger to the building an opportunity to "take a deep breath" and relax enough to locate information which will direct him to where he must go without adding to his intimidation or further agitating him. Provision should be made for Court customer service/information booths and appropriate access/queuing space. Provision should also be made in the lobby for terminals or information kiosks to allow members of the public to check the status and location of their cases. The customer service booths should be expected to have computer terminals and telephones. Signage will be an integral part of the lobby. Therefore, it should be clear, unambiguous and in keeping with international standards. In addition, there should be facilities for a building directory, regulatory/security signs and emergency evacuation route signage to be located close to the entrance. The lobby space must include two waiting areas with seating so that individuals may wait for others and older persons may sit to compose themselves. This area should be expected to be manned by Court Customer Relations Representatives and security staff.

The Public Address [PA] system with a zoning function should allow for the lobby areas to receive public announcements. The lobby area should symbolically portray the dignity of the Court through the implementation of selected design elements and should be readily identifiable to first time visitors. Appropriate use should be made of materials and space to ensure that this area fits in with the general professional appearance of the entire building.

3.0 CIVIL REGISTRY

The Civil Registry is part of the engine room of the Court's system and should be easily accessible from the lobby. The layout of Offices must be based on the sequence of operations and the proposed resources.

The main activities in the Registry are the registration and recording of land titles/deeds, births, deaths and marriages. The Civil Registry space shall provide for the staff as indicated in the schedule below.

Staff Position	Number of Positions	Office Type	Suggested Area Per Occupant (SF)
Deputy Registrar - Administration	2	Enclosed	150
System Administrator	1	Enclosed	120
Senior Executive Officer	1	Open Cubicle	100
Senior Vault Attendant	1	Open Cubicle with unobstructed view of vault	100
Clerk	6	Open Cubicles	70
Clerk/Typist	2	Open Cubicle	70
Vault/Office Attendant	4	Open Cubicles	70
Binder	1	Open Cubicle	70
Office Attendant	1	Open Cubicle	50
Document processing area	1	Open Area	288

The remaining space requirements are indicated in the schedule below.

Space	Suggested Area (SF)
Research Room for law clerks/public	1,000
IT Server Room	100
Counter surface area	40
Registrar Waiting Area	150
Printing / Binding Room	200
Lunch Room	200
Security Desk	50
CCTV / Security Room / Police Post	200
Public Entry and Security Check lobby	1,000
Staff Circulation	TBD
Public Circulation and Waiting Area	2,670
Elevator and Stair Well	1,000
Staff Wash rooms	TBD
Public Washrooms	TBD
Janitors Closet	80
Marriage Room	150
Cashier Cubicle	40
Vault	1,500
Service (MEP) Room(s)	TBD
Sick Bay with toilet, shower and face basin	150

Attention must be given to the following sub components of the Registry

3.1 The Counter

The Counter of a Civil Registry is of great importance. It is the interface with the public. In the civil or commercial divisions, people come to the counter to initiate actions and to file various documents during the course of a case. People also come to get information about procedures and processes. The five (5) staff attending to them must stamp the documents, enter information in computers and books, cancel stamps or accept money as filing fees, and assign dates. They must also search for information on computer terminals [sometimes in books] and give out information. The duration of each interaction varies. The members of the public who come to the Civil Registry counter include attorneys, attorneys' clerks, litigants and members of the public. There must be some visual privacy for the various parties at the counter. There must be one enclosed booth for the exchange of confidential / private information with one of the staff.

3.2 Vault within the Civil Registry

Although there must be a central vault area, provision should be made for safes in the various important offices.

The civil registry vault should be approximately 1,500 SF in area with a ceiling height of approximately ten (10) feet. The vault must be fitted with a vault door [80" x 48"] that offers a physical and fire defense barrier constructed of minimum 1/8" inner and outer steel plates filled with a fire insulating material that provides a barrier against extreme heat. A spy-proof key locking dial with a 3-point handle is standard. The vault design must also consider the following:

- The vault should be outfitted with compact shelving that can take heavy loading. The ceiling should be a reinforced concrete slab approximately 10 ft from the floor. The walls and floor should also be reinforced concrete.
- An intrusion alarm is required.
- The threat/risk assessment of the geographic area in which the vault is located.

• No walls to the building should serve as a wall of a vault. Walls and ceilings shall be capable of resisting fire hose spray and sprinkler discharge without damage to the vault interior contents.

- Dry fire suppression within the vault is necessary.
- HVAC settings for temperature and relative humidity in the records storage areas should be between 60 to70°F and relative humidity of 35% to 55 %.
- Air-conditioning units should be located to prevent water from dripping on records.
- Heat and smoke detection devices, fire alarms, as well as hand-held fire extinguishers must be installed in the vault
- Five-hour fire resistant rating

3.3 Binder and Printing Area

The Registry must have an area for minor repairs, binding, scanning and printing of documents. The area must contain a work table and locations for a binder, scanner and photocopier. This area shall also accommodate 2 office desks and stationary storage cupboards.

3.4 Lunch Room

A lunchroom should be provided at the back of the Registry for staff. Space should be provided in the lunchroom a table with seating for 10 persons as well as counters along the wall with stools, kitchen counter and cupboards, a sink with a drainboard, a large refrigerator, microwave and a kettle.

3.5 Washrooms

Male and female washrooms must be constructed at the back of the office.

3.6 Cashier Cubicle

A cashier's cage is required. Security plays a vital role in this area, especially since cash is dealt with here on a daily basis. As such, security cameras, which are focused on the cashier's cage, must be set up and a panic alarm positioned by the cashier for easy access. Furthermore, provision should be made available for those persons who wish to pay by debit or credit card.

3.7 Marshal's / Bailiffs

The Marshal's and Bailiffs will support the work of the Civil Registry and the Court and should be located within the building. There should be a counter for the Marshals/Bailiffs to interact with the public in so far as their functions in the Civil division is concerned. A workspace of approximately 36 SF per bailiff is necessary and they will also require space for cabinets, including fireproof cabinets for the storage of documents. As part of their duties, Marshals are also required to enter data on the court's database, so computer terminals must be accommodated in this space. Space is also required for a photocopier and printer.

3.8 Registrar's Chambers

The Registrar is a Judicial Officer and is also responsible for the work of the Civil Registry and the administration of the judicial work of the High Courts. Two offices should be provided for registrars within the Civil Registry as well as the high court areas as identified in the space requirement table. There should also be a waiting area for the members of public accessing these offices, but this area need not necessarily be a dedicated area.

4.0 HIGH COURT ADMINISTRATION

The High Court Administration will provide staff office space as per schedule shown below.

Staff Position	Number of Positions	Office Type	Suggested Area Per Occupant (SF)
High Court Judge	3	Enclosed	395
Master	1	Enclosed	300
High Court Registrar (includes private washroom)	1	Enclosed	350
Deputy Registrar	1	Enclosed	300
Senior Court Administrator	1	Enclosed	150
Court of Appeal Administrator	1	Enclosed	150
Computer Programmer	1	Enclosed	150
Senior Bailiff	1	Open Cubicle	100
Bailiffs	5	Shared Open Space	350 plus circulation
Executive Officer	1	Open Cubicle	
Staff Position	**Number of Positions**	**Office Type**	**Suggested Area Per Occupant (SF)**
Court Clerk	3	Shared Open Space	210 plus circulation
Senior Clerk	5	Shared Open Space	350 plus circulation
Clerk	13	Shared Open Space	910 plus circulation
Clerk/Typist	7	Shared Open Space	490 plus circulation
Office Attendant	1	Open Cubicle	50

The remaining space requirements are indicated in the schedule below.

Space	Suggested Area (SF)
Court of Appeal (one)	1,920
High Court (two)	1,005 (ea)
Masters Court (one)	875
Judges Lounge	700
Lawyers Lounge	360
Law Library	3500
Public Male and Female washrooms	TBD
Staff Male and Female Washrooms	TBD
Printing Room (s)	TBD
Vault	1500

Lunch Room	300
Security Desk	50
Witness Waiting Room	100
Witness/Attorney briefing Room	100
Large Case Management Conference Room (one)	480
Small Case Management Conference Room (two)	400 (ea)
Public Circulation	TBD
Judges /Staff Circulation	TBD
Janitors Closet	80
Services Room (MEP)	TBD
Sick Bay with toilet, shower and face basin	150

4.1 COURTROOMS – GENERAL DESIGN GUIDELINES

Possible layouts for various rooms are shown in Appendix A. The consultant is free to adjust dimensions and shapes to allow for conformity with the building dimensions. However, significant departures from the suggested spatial areas above and layouts provided in Appendix A, must be approved by the client.

All courtrooms should be barrier-free and make provisions for all categories of users including the physically challenged including the visually and hearing impaired. The ADA requirements provide the best standards for these categories of users. Although universal compliance with ADA requirements in all courtrooms for each participant is rarely found, creative use of portable lifts and the installation of ramps, where appropriate, will provide the flexibility needed to comply with ADA requirements.

Courtrooms should be built with technology in mind. While building materials, lighting, acoustics, furniture, fixtures and fittings must all be integrated to deliver the values and image of the judicial system it is most important that they are functional and user-friendly. In terms of design, the courtroom must cater to the specific needs of various persons such as the Judge/Master, the Judicial Support Officer, Court Reporter, Attorneys, Witnesses, Jurors, Media, and the Public Spectators. As such, consideration must be given to the following

Courtrooms should be designed to provide optimum security. Light switches and other controls should not be accessible to witnesses or the general public.

Fire exits should be strategically placed and they should be properly illuminated. Witness boxes, judges benches should all be designed with security in mind.

The following measurements for identified courtroom elements are all set to meet a recommended court standard.

The traditional courtroom is rectangular in shape and longer than it is wide. This provides for good peripheral vision from the bench. All participants must have clear lines of sight; especially the judge/master. The judicial officer should be in a position to access all the activity in the courtroom in his peripheral vision or with very little turning of the head. The clerk and the court reporter should also have clear lines of sight.

The large civil courtrooms should be approximately 35' x 40' and the smaller ones approximately 35' x 25'. These spatial specifications include the public [spectator] zone with a 12' high clearance in the litigation area and a 10' ceiling height in the spectator space. In addition, provisions should be made for structure/decking and a clearance should be made for ducts and lights. The diagram below highlights the possible allocation of space.

The courtroom area must be soundproofed so as to ensure an independent, unhampered environment during court proceedings

4.2 Seating Schedules For Various Courts

The Appeal Court seating schedule will be as follows:

Room Seating Schedule Court of Appeal (1 no)		
Zone Name	**Zone Area (m2)**	**No of Seats**
Attorneys	34	27
Circulation	51	NA
Clerks	15	3
Judges	22	7
Public	41	56
Witness Box	5	2
TOTAL	**168**	**95**

Room Seating Schedule Civil Court (2 no)		
Zone Name	**Zone Area (m2)**	**No of Seats**
Attorneys	12	10
Circulation	38	NA
Clerks	4	2
Judges	8	1
Public	16	16
Witness Box	5	2
TOTAL	**83**	**31**

Room Seating Schedule Masters Court (1 no)		
Zone Name	**Zone Area (m2)**	**No of Seats**
Attorneys	12	10
Circulation	28	NA
Clerks	4	2
Judges	8	1
Public	11	8
Witness Box	4	1
TOTAL	**67**	**22**

4.3 The Judge/ Master

The Judge/Master should be positioned so that he/she is able to have command and assert his precedence over all activities in the courtroom and should be placed adjacent to the judicial support officer and reporter's station. He/she should have the luxury of viewing all activity in peripheral vision or with very little turning of the head. Easy access to control buttons necessary to activate panic buttons or any technological features should be arranged. The Judge's / Master's bench is typically three [3] steps above the litigation area [approximately 21"] and the eye level of the seated Judge must be higher than that of a standing attorney.

There are several options for placing reference books. If they are placed at the back of the judge along the wall, there should be at least a five-foot [5"] clearance between the judge's desk and the opposing wall so that the Judge can reach for reference books. In an Appellate court, a similar space behind the judges allows them to enter and sometimes to confer in an effortless fashion. Other options for placing reference books provide for the judge's table to be designed to accommodate them without obstructing his view. Typically, the ceiling above the Judge should be a minimum of eight feet [8"] high and preferably eight feet six inches [8" 6"]. The minimum height of the arena is thus ten feet six inches [10" 6"] to twelve feet [12"] clear. Above right is a sectional elevation highlighting the afore- mentioned dimensions.

4.4 Judicial Support Officer And Court Reporter

Both the Judicial Support Officer and Court Reporter should be located in close proximity to the Judge and should have clear lines of sight to all court proceedings. They will require appropriate shelving and storage areas underneath their workstations. The Judicial Support Officer should be able to relate to the Judge with ease so as not to disrupt court proceedings and the Court Reporter should be in a position where evidence and witness testimonials are easily obtained. The Judicial Support Officer and Court Reporters must have adequate facilities to lock up equipment in court during lunch breaks and after court.

4.5 Attorneys

The Attorneys should be so positioned as to facilitate a smooth interaction between themselves and the Judge and witness. The Attorney's tables should be able to accommodate at least five Attorneys on either side of the presentation podium. This table must also be constructed in a manner that easily accommodates disabled Attorneys. The Attorneys presentation podium should be able to accommodate two attorneys' side by side. This reduces cost by enabling the sharing of podium technology but allows attorney for each side to use his laptop on his side. Alternatively, there can be a podium on either side of the bar table, or there can be a central podium from which the attorney addressing the court or examining the witness may speak. Details of the presentation podium with audio/visual technology will be outlined in the section on court technology. All bar tables should also be miked. This allows the attorney not at the podium to object and make appropriate submissions. Provision should be made for the charging of attorney's laptops.

4.6 Witness

The expert witness when required, should be visible and his/her voice audible to the Judge as well as the attorneys but the witness stand should not be in too close proximity to the Judge's bench. Furthermore, he/she should be elevated at least 2‟ 2" with the front barrier being 2‟ 10" in height. Provisions may be made for an interpreter where the need arises. Proximity of the witness box to the Court Reporter is important to ensure effectiveness of the court reporting process. When audio recording is used, the witness should be miked and on a separate track.

4.7 Interpreters' Booths

The interpreters' booths which are approximately 36 SF each should be located at the back of the courtroom and should be sound-proofed, separated by glass from the courtroom and wired for the appropriate technology. Although interpreting technology will not be required in all courtrooms initially, it is best to design most courtrooms with booths.

4.8 Technicians' Booths

Technicians can monitor three courtrooms at a time. This will therefore require a booth approximately 64 SF at the back of a courtroom that will be wired to facilitate the necessary equipment. This booth will need to be soundproofed and separated by glass from the courtroom.

4.9 Spectators

The public and by extension the press, are allowed to view most court proceedings. The spectator and media seating should cater for disabled individuals and enable easy viewing and hearing of courtroom proceedings. Limited spectator seating means a crowd that is easier to control. Spectator seating for 42 to 50 persons is quite adequate. Two or three seats in the spectator area should be available for media reporters. Provision for media to plug in laptops is advisable.

4.10 Public Waiting Areas

Outside Courtrooms Once court is in session, people tend to congregate in the hallways, resulting in congestion and noise. In order to solve this problem, public waiting areas should be provided in designated areas outside of the courtrooms. This region should be away from the hallways, in a semi-enclosed area and preferably located near the escalator and/or public elevator. Appropriate technology in the form of efficient communication systems must be implemented to allow those waiting to hear when their matters are called. Such technology would include the use of an intercom and an electronic board or terminal listing all cases to be heard on that day and indicating their estimated times of beginning. Drinking fountains and at least one public telephone should be made accessible to court users, with special provisions for the disabled. Security personnel should always be well positioned and highly visible

4.11 Special Witness Rooms

Separated and protected areas should be provided near the courtroom for special witnesses. These rooms should be soundproofed with the provision of adequate lighting and security. There should be a 100 SF space in every witness room. These rooms should also be located in close proximity to the courtroom that it serves and be compliant with ADA requirements that include a thirty-six [36] inch doorway to accept wheelchairs. These rooms should be furnished with workstations, chairs and access controls to keep its occupants safe from outside interference. An emergency phone should be included as a security measure. In terms of security, there should be some form of access control

4.12 Judicial Officer's Chambers and support

All chambers must have access to the judicial private circulation zone so that any judge/master is able to gain direct access to a courtroom through private corridors, using staircases and elevators, if necessary, without crossing a public circulation corridor. The clustering of Judge's / Master's chambers is advised as it permits the pooling of resources and enhances security. Provisions should also be made near/ outside the chambers for judicial support staff. Details are provided in the space planning guide table.

It is necessary that Judges have large chambers in order to facilitate bookshelves, files, pleadings, briefs, and reading as well as meetings with attorneys when necessary. The necessary measurements are outlined in the space planning guide table. The chambers must provide for an executive workstation and credenza, sitting area, computer station, heavy duty library shelving that can accommodate appropriate load, a comfortable soft seating arrangement, three guest chairs at the judge's desk, a little conference table that can accommodate four to six persons, and washroom facilities [including closet space]. A panic button should be installed in each chamber

4.13 Judicial Officer's support Staff

In each Judges' / Master's Bay, provision must be made to accommodate support staff. A space of approximately 316 SF is required for each bay and this includes space for a Judicial Research Assistant [64 SF], Judicial Secretary [64 SF], Orderlies [36 SF], Cabinets [72 SF] and visitor area [36SF]

Provisions must also be made for a document center at which can be placed additional shelving, cabinets, heavy-duty photocopier, shredder, and printer.

4.14 Judges'/Masters' Common Room

The common room should be approximately 700 SF and will comprise a small kitchen, table and chairs and a lounge area with sofas, and side tables. Reading material and a television must be provided.

4.15 Court Administration - Court Manager's Office

The Court Manager will be responsible for the administration of the Court and will therefore provide support and services to all of the Court's internal and external customers. An office space of approximately 384 SF is required. Outside there should be space for a secretary and filing cabinets.

4.16 Law Library

The Law Library should be located so that it is accessible to the judges. It should be approximately 1,500 SF and will serve two sets of users. Its primary users are judicial officers but access will be given to attorneys. There should be two separate reading rooms within the library, a private one for judges and a larger open area for attorneys. To facilitate both sets of users, there should be a public entrance for attorneys and another entrance via a private corridor for judicial officers. Although electronic databases and online services will be available for users, the library will carry hard copies of collections of legal reference books and materials. Provisions must therefore be made for the appropriate loading and structurally sound flooring in order to handle the volume of shelving.

The Court Librarian who usually oversees the operations of the library should be provided with office space within the library. Accommodation must be provided in the library for staff with workstations. An office space of approximately 196 SF must be provided for the Court Librarian and a workshop of approximately 200 SF must also be included in the facility to store and sort library materials and books. The library should be furnished with appropriate freestanding, adjustable shelves for maximum flexibility, cabinets for judgments and indexes, large work surfaces and smaller carrels for convenient use. Shelving arrangements should also make provisions for handicapped users. Open study areas with on-line computer facilities, a photocopy machine, a circulation desk, book stacks and storage areas should be allocated space. Natural lighting is preferable especially in work areas.

Other Considerations for the library

• The temperature is extremely important in maintaining the quality of the books and materials.
• It should be soundproofed and have natural light, where possible.
• Because of the weight of the books and other holdings, consideration should be given to the location of the library.
• All librarian work stations and reading carrels should be equipped with electrical laptop charging outlets
• Locations for a photocopying machine, large book scanner and other office equipment are needed.
• Wi-Fi Network capability for Internet access is also required.

4.17 Security Control Centre

The security control center should be allocated a space to house the CCTV equipment and personnel and should be located close to the lobby. The control room acts as the central station for the building's monitoring and access control systems. All security zones and safety alarm systems are monitored, and assistance dispatched, when necessary, from this center. The control room will be located within a secured zone with all the appropriate security features built in to ensure proper access control. Provision must be made for several phone lines and for desks, lockable file cabinets, storage lockers and open workstations with desks and chairs. In the remaining space the following are required:

• An office space Security Officers
• An equipment room

4.18 Information Technology

This Unit develops and administers Court management information systems and other technology systems that support the operations of the Court. The Unit should be located in an area that is restricted but with access to all circulation flows. The choices for the location of the Unit are limited by the possible weight of the equipment as well as internal and external security concerns. The Unit should be placed on the ground floor of the building. The Unit serves as the hub of the information technology back-room activities of the Judiciary.

The design issues to be considered include:

- Internal Customer Support -This is the reception area through which all traffic flows into the office. Entry is with permission of Senior IT staff only.

• Storage - Two areas for storage on site are needed. One for workbench equipment located near to the workbench area. This equipment includes trolleys. The second storage area is to be used for consumables, new equipment [including printers, computers and other smaller components] This should accessed be by authorized persons only;
• Staff Accommodation - Privacy for work is required, but there should be clear lines of sight of the operations at all times. Glass walls throughout the IT office [except for storage areas] as room dividers

are advised. Technical staff will need multiple electrical outlets and data ports at their desk. Two enclosed office spaces are needed, but with large vision panels or glass walls. All supervisory staff
• The Operations Centre and Server Room. – The Operations Centre and Server Room require very high security and extremely limited access. Backup air conditioning is required as is pipe-borne environmentally friendly fire suppression. This area requires a raised anti-static floor. Multiple electrical outlets [regular and UPS] should be raised above the podium level. Consideration must be given to the voltage of the equipment to be installed as well as to any special ends required by the equipment e.g., lock and twist plugs. Regular as well as UPS outlets must cover all equipment in the IT unit. This should be supported by emergency generator power in case of electrical failure.

On each floor, data and other cables are run horizontally along cable trays placed either in the ceiling or under the floor. These cables should terminate in wiring closets on each floor. Vertical links are then run from floor to floor through core holes located in the wiring closets. A minimum of three core holes, each 5 inches in diameter minimum should be placed in the Operations Centre and Server Room. The ends of these cables are expected to terminate in a rack. The wiring closets for each floor must therefore be placed above and below the IT Operations Centre requires space to accommodate at least two visitor chairs.

4.19 Court Reporting Services

The Court Reporting Services Unit will support the work of the Court in their delivery of timely transcripts. They will operate from a central location with connectivity to the Court to allow for online and real-time transcription. Space must therefore be allocated to accommodate staff and equipment. Provision should be made for six desks in open layout.

4.20 Central Vault

Similar to Civil Court vault

4.21 Court Administration-:

Other Functional Areas Space has been allocated for court administration and all other administrative and functional areas. Refer to Space Planning Guide.

Other Building Support Spaces

• IT Monitoring Rooms Two Information Technology monitoring rooms are required to monitor all the courtroom technology and space has therefore been allocated. Technicians will oversee several courtrooms simultaneously from this location through the use of monitors. Having four walls in these two rooms to place racks and monitors are extremely important. There must be easy access from this area to the courtroom floor.

• A Staff Sick Bay is required in the event that a member of staff falls ill. This space should include a bed, toilet, shower, face basin and a sofa and first aid supplies. It should be well ventilated.
• Barrier Free Restrooms must not directly adjoin courtrooms nor should they be directly above them. All restrooms should contain male and female washrooms. A sufficient number of washroom facilities should exist to serve the male and female members of the public. They should be located on each public floor particularly on the main court floor, and preferably grouped together near public waiting areas so that they can be easily identified and also to reduce plumbing runs. The toilets should be screened from the public view without the use of double door vestibules at entrances. All public and common-use toilets must have facilities for the disabled and comply with ADA guidelines. The layout of toilets should minimize circulation space.

Washrooms for staff members should be confined to the allocated private staff areas of the courthouse. Judicial officers and senior administrators however, should have their private washrooms within their personal chamber spaces.

• Janitors' Closets

Janitors s should be centrally located on each floor near toilet facilities and be directly accessed from the corridor. They should have all equipment and supplies needed to service the area viz cleaning tool cart, vacuum, floor polishers etc. Each closet should have a mop basin, shelving, cupboards and a sluice sink.

• IT Closets

Space for IT closets of approximately 25 SF should be allocated on every floor. Closets should be stacked vertically using the same plan configuration from floor to floor to accommodate vertical risers for backbone systems

• Services

Space for MEP Services must be provided for on each floor. Spaces should be stacked vertically where possible using the same plan configuration from floor to floor to more easily accommodate vertical risers for backbone systems

• Mail Centre

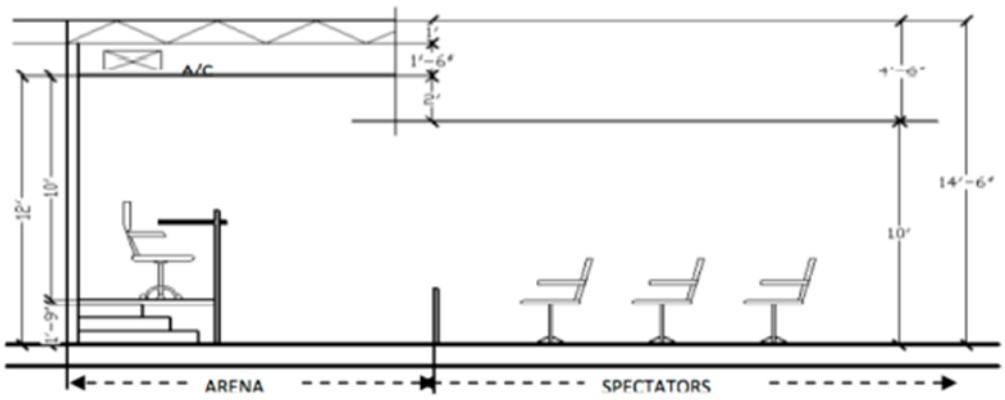
Since terrorists contaminated the U.S. mail stream in October of 2001, safety and security have become central issues in the performance of mail operations. The Mail Centre should therefore be designed not only to promote the efficiency of mail processing but also to ensure the safety of occupants. The Mail Centre should as much as possible, be located away from the facilities' main entrances, areas containing critical services, utilities, distribution systems, and important assets. Ideally, the Mail Centre should be

located at the perimeter of the building. The preferred area will allow mail to travel directly to the centre from outside so as to minimize the impact that any potentially contaminated mail will have on the rest of the building. The Mail Centre will also be responsible for collecting and redistributing inter-office mail and coordinating the pick-up of mail from within the building at specific times. The Mail Centre must therefore be equipped to handle deliveries from couriers and to provide a high level of service and guidance to building occupants. A screening machine is advised as well as space for manual operations, including the sorting, metering, and inspection of letters and packages. The Centre will require a space of approximately at least 144 SF. The users will require the following:

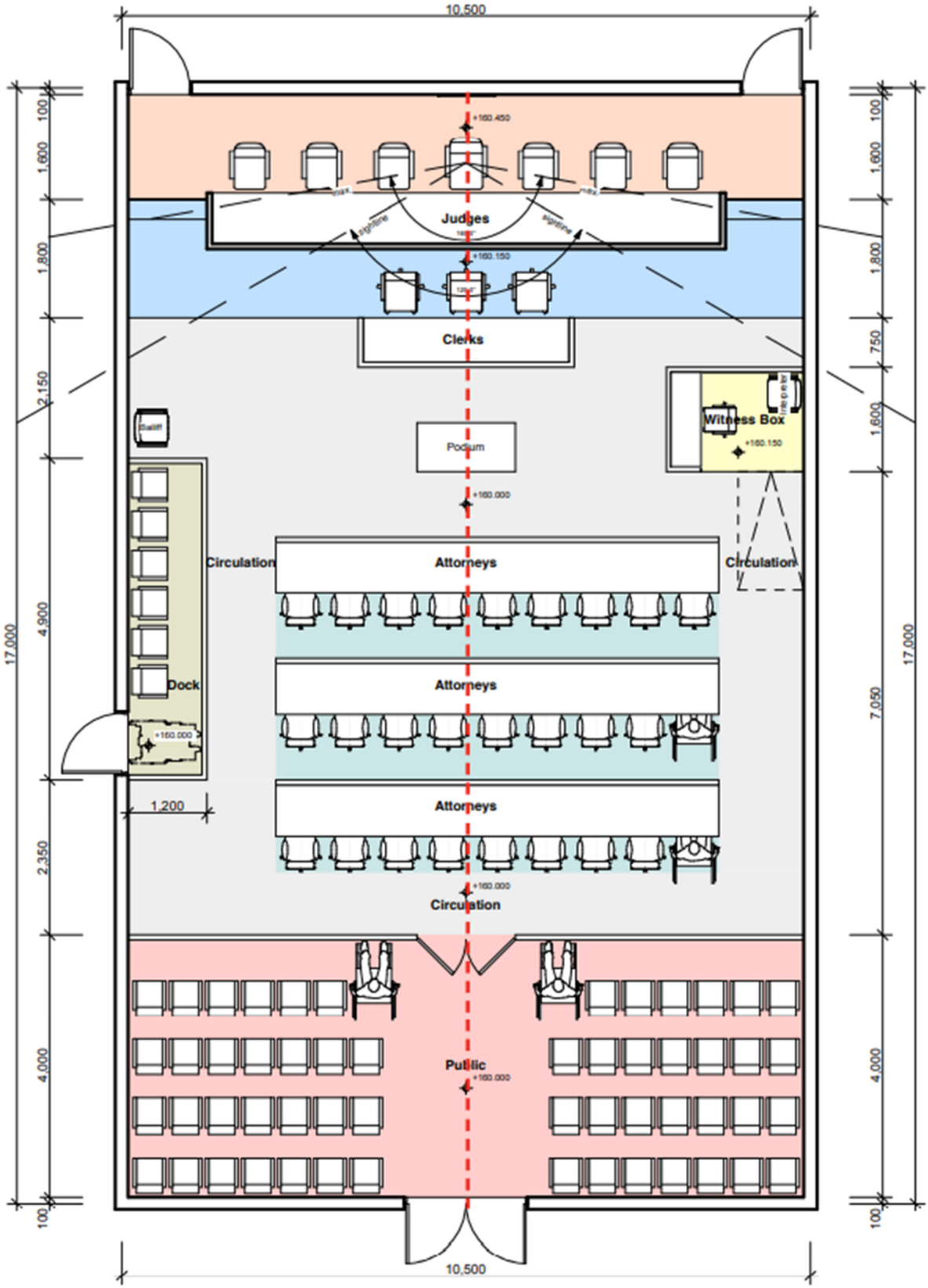
• Operational space for built-in fixtures in the mailroom, base cabinets, work surfaces, and shelving units. Work surfaces will be required at different heights to accommodate a variety of tasks performed by both standing and sitting users.
• There should also be space and equipment to facilitate proper sorting and analyzing of mail, and where necessary, quarantine/containment capability

APPENDIX A

Possible Room Layouts



Sectional Elevation Of Arena / Spectator Space For A Standard Courtroom


10,500
Judges
Clerks
Witness Box
Podium
Circulation
Attorneys
Attorneys
Attorneys
Circulation
Dock
1,200
Circulation
Public
10,500
17,000
17,000

Possible Appeal Court Layout

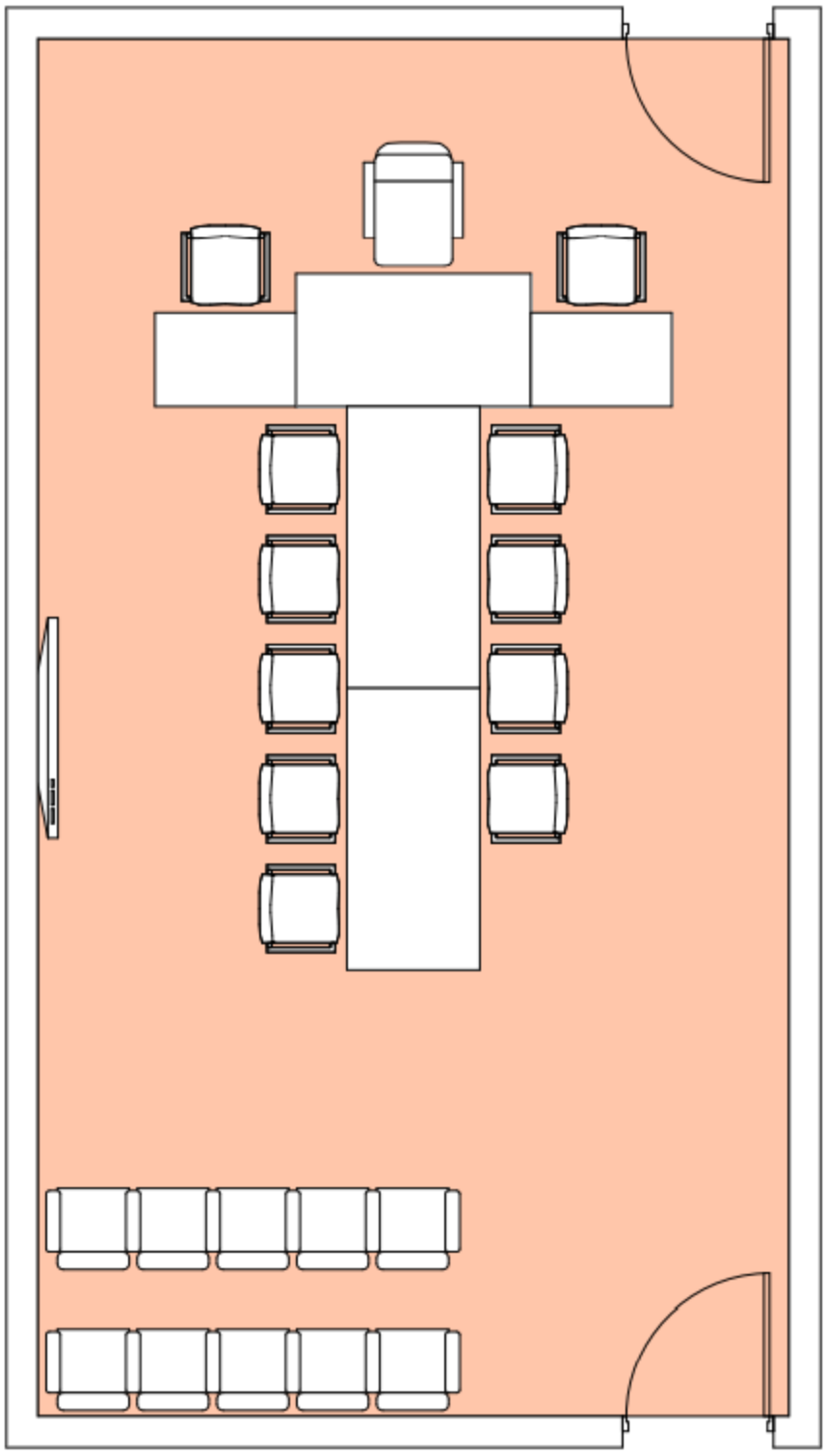
Notes:

(i) ***The layout above was take from the 2011 Feasibility Study. Changes have been made since that time as indicated in notes ii and iii below***

(ii) ***The Dock on the left-hand side and the podium in the center should be removed***

(iii) ***The standard courtrooms will follow the same style layout, but conform to the seating schedule as provided in section 4.2 above.***

Possible Layout For Judge's Chambers [395 Nsf]



Possible Layout for Case Management Conference Room

Eastern Caribbean Supreme Court [ECSC]
Project Implementation Unit [PIU]
Halls of Justice Project [HoJ]

Date: 16 September 2010 **REV**: 1.0

Eastern Caribbean Supreme Court – Design Guidelines for Halls of Justice

Contents:

HOJ PIU, 2nd Floor Heraldine Rock Building, The Waterfront, Castries, St. Lucia. Tel. [758] 457-3600

1 - GENERAL

These guidelines do not diminish the standard or duty of care owed by the designer to the owner, nor do they relieve the designer, in any manner whatsoever, from any professional responsibility, duty or due diligence required towards the work. Although this document is produced as guidance only, the designers are expected to carefully review the intent and ensure that adequate consideration has been taken, and either addressed in the design or specification documents, or both, as the case may be, or where not incorporated an adequate substitute is inserted. The guidelines have been purposely written using the word “should” and not “shall”, thereby giving the designer latitude to identify alternate or improved solutions, but also putting the onus on the designer to account for variances. It is not intended, nor feasible, that these guidelines address every conceivable point, issue or condition, instead they seek to provide guidance, direction or possible solutions to questions, problems and/or issues that arise on many similar building projects. Where the guidelines are silent on a particular point, issue or condition, the designer may use his professional judgement or approach the owner’s Project Director for a statement of no objection on the designer’s recommended solution. Figures have been shown in most cases in both metric and imperial figures. Conversions between metric and imperial are not exact, and have been rounded to reflect conventional modular increments or standard practice.

2 - GUIDING PRINCIPLES

The court building should have a dignified and timeless quality, reflective of the permanence of the justice system and the importance of law in society. A civic presence engenders respect for decisions made in court; the law court function should therefore visually dominate any other function within the building. The design should create a spatially efficient building, creatively planned to aid the complex circulation patterns inherent in the building type, yet responsive to the functional requirements of the court, registries and other program areas, and the users. The basic building mass should ideally be rectangular in shape and cuboidal in form, and benefit from strong lines of symmetry. The fundamental design should be structurally repetitive and based on good engineering practice and standard modules, which will minimise cost and material usage, and maximise efficient and effective use of resources. Value for money is of high importance; therefore the designs should address multifunctional uses where possible, such as upstand beams that function as railings, and structural columns that are aligned to provide window mullions. Design elements such as cantilevered slabs and curved facades, whilst desirable, have been proven to be cost ineffective and should not be considered. Pitched roofs, in keeping with local vernacular, may be considered, in conjunction with other design considerations such as plant location, elevator machine rooms, water storage tanks, etc. Materials selected should consider not only physical durability, in terms of durability, performance and maintenance, but also their symbolic value and cultural associations. From the outset of the design, security of the users [judiciary, staff, public, persons in custody] should be taken into consideration. Areas of entrapment should be avoided; for example, recesses and alcoves along exterior elevations should be omitted, and columns in lieu of shear walls at enclosed public spaces are preferred. For security reasons public pedestrian entry portals should be kept to a minimum. Special consideration should be given to external landscaping features, particularly with regard to concealment of explosive devices. For similar reasons, vehicles,

except custody vehicles and selected judiciary and staff, should not be able to approach the building. Entrances should be easy to locate, welcoming, and designed to accommodate the needs of both mobility and sight impaired persons. Ideally, barrier-free access must be considered from the beginning of the design process, so that all persons are able to move around the building by the same routes, without the need for awkward special measures. The buildings should be a role model in sustainable design and operational practice, therefore careful integration of the function of the enclosure assembly with the mechanical ventilation system to provide the human comforts required of interior spaces, the provision of high quality air, and minimising the operating energy consumption of the buildings over their service life will be required. Energy costs will increase over the service life of the buildings, therefore prudent thinking will be required when considering strategies for energy efficiency; easy and low cost solutions such as increased insulation thickness should be seized at every opportunity presented. The facilities management process should also be considered during the earliest phases of design and should be considered to be an integral part of the building. Appropriate design decisions can support custodial care, ease of maintenance of the premises and building equipment, materials and surfaces. In summary, these “ten steps to success” design principles should be considered at every juncture throughout the evolution of design, with no one being more important than another: 1] context, 2] functionality, 3] value, 4] security, 5] durability, 6] accessibility, 7] independence, 8] flexibility, 9] clarity, 10] environment.

3 - SPECIFIC DESIGN GUIDELINES RELATED TO COURT BUILDINGS

Occupancy Profile:

Court Administration Personnel involved in the overall management and coordination of court activities, including reprographic and binding areas, storage of records and evidence

Judges/Magistrate/Registrar’s Chambers Including legal secretaries, clerks, deputy registrar’s, meeting and conference areas

Lawyers Areas And Ancillary Facilities

Areas for Bar Association members to confer with clients, also includes robing rooms

Public Services Areas Including security screening, public hall and corridors, information areas, registry / filing areas, waiting areas

General Building Services Including general building administration, IT equipment and building utility rooms, food service areas, washrooms, janitorial, etc.

Parking Including secure judges parking area

Design Life:

The court is a long-term owner/operator of their building infrastructure. The building life expectancy should reflect this long-term commitment to durable facilities within the context of the climate and maintenance programs. The building should be designed for a life expectancy as follows:

ELEMENT	DURABILITY (Years)
Structure	100
Building Envelope (including roofing)	50
Mechanical Systems (without major upgrade or replacement)	30
Interior Components and Assemblies	25
Finishes (Case specific)	10 minimum
Technology	TBD

Structural:

All courtrooms require clear spans [court well and public viewing area] and there should be no obstructed views anywhere within the courtroom space. Wall lines should be clear, however if a column or other such feature [e.g. enclosure of rainwater downspout] is required to project into the courtroom space, the maximum limit of the projection should not exceed 6" [150mm]. Certain areas within the building, such as the Law Library and Court Records Unit, will require higher than normal floor loadings, to accommodate shelving and/or high-density filing cabinets. These spaces should be identified early in the design process and located in areas best suited to carry the additional load. Access flooring will be required in selected areas of the building, including within the court well [but excluding the public gallery]. Areas requiring access flooring should be identified early in the design process and suitable accommodations allowed within the structural design. In selected areas, such as the public counters in the Registries, the floor should be raised to provide a height differential between the public and staff sides of the counter; the height differential should be taken up by means of a ramp, not a step. Where used, access floors should be carefully selected and detailed, as drumming, creaking and footfall noise will not be permitted. Selected areas, particularly large conference rooms should be divisible by means of folding partition. STC ratings in excess of 50 are required in order to maintain privacy. The structural design should be able to accommodate both overhead or floor mounted partition units. Careful coordination of building services will also be required.

Finishes:

Robust and durable floor finishes should be used in all public circulation areas, terrazzo [in-situ or tile] being particularly apt for this purpose and should be actively considered. High quality ceramic tile may also be considered, however jointing should be flush with field floor level [i.e. recessed grout joints are not favoured]. Cognizance must be taken of the higher noise levels caused by reverberated sound, and

appropriate acoustical treatment considered. Thermal expansion should also be considered, and appropriate steps taken to create expansion joints at suitable intervals to prevent cracking.

Shelving:

Shelving in Law Library should be adjustable with frames complementary to the decorum and aura of the library. Shelf units in other area, such as Registry records, stores, etc. should be metal rack type shelving suitable for storage of bankers' boxes as well as lateral files. Safe means to access of heavy bankers' boxes placed at the higher levels should be given consideration.

Robing Rooms:

Private non-lockable storage cubbies should be provided in robing rooms, which will be used for the storage of jackets and blazers whilst lawyers are in court. For security reasons, the robing room should be lockable.

Reprographic And Bindery Areas:

All large-scale printing, photocopy, reprographic and bindery areas are to be considered as sources of high air pollution, and should therefore be fully contained within rooms and separately ventilated from the remainder of the building.

Ceilings:

While no minimum ceiling height is stated, all ceilings should be proportionate to the space. Ceiling heights in public spaces should reflect the significance of the area and be an integral component of its design. In keeping with the importance of the space, ceiling heights in courtrooms should be higher than adjacent spaces, and should comfortably accommodate a raised judge's dais [access to dais by means of ramp], and possibly a raised public viewing gallery [allowance to be made for mobility impaired persons]. Higher ceilings also improve room ventilation, and the height should therefore be carefully considered in conjunction with other members of the design team, however, it is expected that the height will be not less than 12ft [3.65m] to the lowest point. The ceiling height should remain proportionate to the overall room, and its field should be segmented by means of bulkheads. All audiovisual equipment should be carefully integrated into the ceiling design, and present an aesthetically pleasing finish.

Acoustics:

Acoustic integrity within the court building generally is of paramount importance, and steps should be taken from the earliest design phases right through to handover of the completed building to ensure the acoustic integrity and sound isolation of the spaces. Generally, a minimum Sound Transmission Coefficient [STC] of 50 will be required, and steps should be taken in the design to accommodate or better this requirement. It is noted that standard 4" [100mm] interior partition walls formed in two slab

drywalls will not achieve this STC even with the inclusion of acoustic insulation, therefore more robust wall assemblies should be considered, such as double track drywall, acoustic insulation and a cavity or solid block wall, all joints sealed and rendered both sides, particularly in rooms such as Jury Deliberation room, Judges Chambers, Lawyers Consultation rooms and Mechanical/Electrical rooms. Should block walls be considered, the additional weight should be allowed within the structural design. However, the integrity of not just the wall, but also the entire room, including doors, vision panels, placement of sockets, tightness to floor and deck, must be considered. Hiring a specialist acoustic consultant to advise on acoustic integrity and sound attenuation strategies should be considered.

Security:

The building should be divided into three segregated circulation / security zones, viz. Public zone, Private zone, Prisoner zone, each with unique security requirements, and these should be established from the earliest design phases, and incorporated into the basic building form. All doors associated with the Prisoner Zone, including doors into consultation rooms should be manually controlled access and operable from a central location, e.g. a security desk. The design should ensure that judiciary, jury [if any], persons-in-custody and public observers come to courtroom without meeting each other until inside the courtroom. Dedicated entrances into the courtroom for each user [as identified above] must be provided, as well as a separate entrance for witnesses. Witnesses and public must not pass the defendant upon entry into or exit from the courtroom. The design should place highest importance on the security of judge/magistrate from attack by the defendant and other persons whilst in the courtroom, as well as security of defendant by members of public observing the case or the defendant absconding from custody.

Video Conferencing And Remote Testimony:

All courtrooms should be capable of receiving remote testimony via video conferencing technology, and should be designed with this requirement in mind. Particular consideration should be given to degradation of contrast ratio of projected images as well as misleading colorimetry effects on video cameras from uncontrolled natural light, which is not say that natural light should be omitted but instead the degree of opacity of the windows should be balanced with system performance. Dedicated remote testimony rooms, likely associated with the family court, should be provided thereby enabling vulnerable witnesses to give testimony in a more private setting.

Audio Visual Systems:

All courtrooms should include courtroom microphone with integrated audio input and processing systems connected to all participant locations [including judge/magistrate, clerks, witness, defendant, counsel positions, as well as general ambient pick-up in the well area], a public address system connected to loudspeakers, central voice recording systems and hearing assistance systems. Provision

should be made for simultaneous interpretation of proceedings in one courtroom, which should allow persons sitting in the public gallery to follow the proceedings.

Natural Light:

General areas should benefit from natural light, and all building occupants should enjoy access to natural light and views, daylight and occupancy sensors should be considered thereby ensuring that general electric lighting is only used when necessary

Barrier-Free Requirements:

The building should be generally accessible throughout. A least one single barrier-free washroom should be made available at each level of the building, and additionally, a barrier-free washroom should be provided in each security zone.

4 - ENVIRONMENTAL CONSIDERATIONS

High Solar Radiation:

High ultraviolet spectrum is particularly harmful to many commonly used building products and promotes rapid deterioration of non-metallic roofing materials, paints, sealants, elastomeric coatings, and wood. High solar radiation results in materials developing high material temperatures. Careful consideration and detailing of connections in cladding and structural assemblies and systems is required.

High Humidity:

An outside dew point of 65°F, or higher, results in conditions favourable to fungal [mould] growth in a negatively pressurized building with an indoor air temperature of 74°F. The MST experience an average dew point of 73°F year round [source: Weather Underground], creating conditions ideal for growth and proliferation of mould that in turn leads to unhygienic conditions within the building as well as the promotion of wood decay. It also accelerates rusting of various metals and intensifies galvanic action in many metals. In addition, the high humidity conditions require careful detailing of vapour barrier locations within air-conditioned spaces in the building. Common building materials that exhibit hygroscopic properties such as gypsum, insulation, and particleboard can lose their structural and functional properties in such high humidity environments. Elastomeric paints do not perform well in such conditions, and therefore must be chosen carefully.

Intense Rainfall:

Rainfall during the season is usually brief but intense, as well as occasional periods of prolonged rain, especially prevalent during passing tropical storms, both often resulting in local flood conditions. Site

drainage must consider these maximum conditions as well as the building envelope, especially having regard to the importance of the documents contained within the building.

Water Usage:

Minimizing water usage will help to reduce operational expenses as well as lessen the environmental burden on local water supplies and wastewater treatment. Water conservation solutions should be included wherever possible or practical.

Hurricanes:

Saint Vincent is susceptible to hurricane threat. Intense winds near to the hurricane centre [the eye] can reach speeds of up to 52 m/s with higher gusts and can be structurally devastating to inadequately fixed materials or poorly attached fittings including primary components of the envelope such as walls and roofing materials. Locally available wind hazard maps should be consulted and structurally the buildings should be designed and connections detailed to resist wind speeds expected in a 1 in 100-year windstorm as recommended by the latest wind speed design criteria that considers the influence of climate change.

Earthquakes:

Saint Vincent sits on the eastern edge of the Caribbean lithosphere plate and experience some tremors each year. Sudden ground-shaking imposes unusual lateral forces and can be structurally destructive to buildings not adequately designed to resist such forces. Consult local historical data on seismic activity and design the structures in accordance with applicable seismic codes.

Salt-Laden Air:

Salt accelerates wood deterioration, promotes galvanic action between metals, rusting of ferrous metals [including inadequately protected reinforcing steel], and pitting of many aluminum alloys. Salt-laden air also adversely effects the application of paints, sealants, elastomeric coatings, and asphalt roofing applications. The design of all buildings must take cognizance of the generally corrosive environment, and provision must be made for additional protective enclosures, materials, and coatings. The use of ferrous materials, including fixings and fittings in exposed locations should be avoided.

Insects:

Termites, particularly the subterranean variety, are a serious threat to exposed untreated wood in buildings and can cause severe damage to electrical equipment, as well as extensive damage to many roofing materials. The use of timber, pressure treated or otherwise, on the exterior of the buildings should be avoided.

5 - SITE WORK

Site Investigation: Where suspected subsurface contamination or possibility of voids and cavities is suspected, further detailed subsoil investigations, such as monitoring wells, ground-penetration radar [GPR] and exploratory soil borings, may be necessary. Defer determination of building foundations or foundation systems until the results have been considered.

Landscaping:

Landscaping should be carefully and strategically located to provide shade to not only the exterior open spaces but also as a means of protection of the building from direct and reflected solar radiation. However, cognizance should be taken of possible damage that trees may cause to the building due to breaking branches or uprooting during a windstorm, as well as possible clogging up of drainage elements, such as rainwater outlets, gutters, hoppers and downspouts. Prior to preparing the landscape design, research the local marketplace to gain an understanding of the availability of desired plant material in the appropriate quantities and of matching sizes. Not all plants are suitable for ornamental landscaping. Noxious plants, root invasion at building foundations and walkways, susceptibility to insect infestation, excessive litter [including fruiting], and so forth, are problems that may arise in the absence of local horticultural expertise. Landscape solutions should be overseen by a specialist landscape architect with local knowledge of native species. Use of high maintenance ground cover such as grass should be minimized, and instead other methods such as xerophytic plants and shrubs and gravel beds should be considered. Also consider that the growing season is all year long, therefore plants will require thinning out more frequently.

6 - CONCRETE AND MASONRY BLOCK

Concrete

Concrete of suitable strength is widely available, and may be considered for the primary structural frame as well as slabs, poured floors, toppings and roof, however the corrosion of embedded steel reinforcement is a major problem. Corrosion occurs when the steel is exposed to moisture and alkaline substances. Suitable design and quality control measures must be included to protect steel from such conditions. Reinforcing steel may require additional protective coatings, as well as an increase in concrete cover particularly in vulnerable zones such as around lap-joints. Cracks in hardened concrete allow moisture and salt to come into contact with embedded steel; minimize such cracking through careful adherence to proper construction techniques and technologies. Type 1 or Type 2 Portland cement is to be specified. Resonance caused by human activity, such as walking, should be controlled; floor designs should be within the “not perceptible” range of vibration as defined by the modified Reiher-Meister Scale. Masonary Block: Standard finished 6” or 8” wide concrete masonry units [CMU], is the primary material of choice in Saint Vincent because it is economical, energy efficient, fire resistant and due to its universal availability and the familiarity of local construction crews with its use. CMU blocks, both solid and hollow, should be load bearing with a minimum net compressive strength of 1900

psi [7.3 N/mm2], and suitable for use in general construction. Split-face and scored-face units in outdoor or exposed applications should be minimised. These units, where available, are difficult to properly seal with block filler during painting and ultimately may contribute to leaks or moisture problems. Additionally, scored-face units may accumulate dirt and provide a place for wind-born seed germination

Use Of Metal Materials Within Block Walls:

Any ferrous metal items [including pipes and conduit, but excepting rebar that is to be embedded in the CMU should be hot-dip galvanized and dipped into a chromate bath and further coated with a bituminous or other protective coating prior to inclusion. Aluminum materials should not be embedded in masonry construction.

7 - METALS

Covers structural steel, miscellaneous metals and metals in a generic nature and does not deal with specific products.

General :

Most metals used externally will deteriorate as a result of exposure to the action of oxygen, water vapour, carbon dioxide, salt and other chemical substances, therefore the use of metals requires careful consideration. High humidity and the heavy concentration of salt in the air, soil and in the water provide an ideal environment for metal corrosion to occur. Protection of all metals from these conditions is critical.

Corrosion Protection:

Care in design and construction should be taken to avoid corrosion of metals caused by galvanic action between two dissimilar metals. Some means of separating dissimilar metals must, therefore, always be found. Because of the combination of both high humidity and salt-laden air, the key to an acceptable steel structure understands that each steel component must be properly and adequately maintained. Any structural joints that are accessible to moisture, including moisture-laden air, are also to be made accessible for proper inspection and maintenance. All connection details must be carefully considered to ensure there is no possibility of reduction in the required performance of the weather proofing of envelope materials.

Structural Steel:

The use of structural steel should be considered, however protection [in transit in storage, and during erection] and maintenance must be recognized in the design. All structural steel must be pre-primed at the factory, with minimal touch-ups on site. Careful attention will be required to detailing of connection

plates, bolt-holes, out-riggers, etc, which should, where possible, be attached or formed in the factory and arrive on site ready to install. Castellated beams, lattice girders and wide flange steel with precast, pre-tensioned hollow core slabs should be actively considered and compared economically to a concrete frame structure. Exposed structural steel should be avoided due to fire risk concerns.

Ferrous Metal:

Avoid unprotected ferrous metal in exposed locations wherever possible. For protected interior locations, hot-dip galvanizing is acceptable; for exposed exterior locations, it is not recommended. If galvanized ferrous metal must be used, it is advised that a three-layered paint coating of all surfaces be applied, consider membrane type paint [not latex] or high solids epoxy for best results. Electroplating or cadmium plating is not permitted.

Aluminum:

Aluminum is subject to pitting or corrosion in salt laden environments. It is recommended that heavy duty anodized coatings be required, and once anodized no further bending or other deformation takes place. For covering large expansive areas, recognize that even light shades of dark colours pick up excessive solar radiation and will need to be treated with a colourfast flouropolymer coating. Because of this potential for heat gain, all designs involving coloured products need to accommodate expansion caused by heat.

Steel Exposure:

Generally, for interior use standard structural steel with a minimum coating system of a primer and one coat finish is recommended. Where structural steel is exposed to the weather and cannot be subjected to a proper maintenance program [despite having been treated with a coating system] avoid its use at all if possible. Use two coats of shop primer in combination with two finish coats. Surface preparation includes sandblasting or mechanical brushing to near white steel prior to paint application.

Fabrication and Construction:

Where structural components are adequately protected from the elements, connectors may be made up of bolts and welds. After steel construction is completed, all damaged shop prime and finish coats should be re-primed with the identical paint material. As in exterior application, surface preparation includes sandblasting or mechanical brushing to near-white steel. Welded connections should be used where structural components are exposed to the elements. If bolted connections are required for structural reasons, they should be kept to the minimum and cognizance taken of maintenance regime required. Design connections to preclude pockets or recesses that can trap dust, debris, and moisture. Intermittent welds should be avoided; all welds should be continuous and designed to completely seal off all contact surfaces of the structural members.

Miscellaneous Metal Items:

Miscellaneous items include anchor bolts, nuts, nails, bolts, screws, straps, connectors, fasteners, and other items used to either secure one or more structural components together or attach one construction item to another. Also included are exposed architectural items such as shutters, louvers, handrails, guards, canopies, balconies, platforms for roof-mounted equipment and other metal items that may be attached or fixed to the building. Where exterior balconies, platforms or other such appurtenances are included, connection details must be carefully considered, and steps taken to prevent staining from run-off. The areas adjacent to miscellaneous metal items are often more susceptible to corrosion than their component parts, due partly because of damage during installation. In a corrosive environment, even with the proper selection of materials, the careless installation procedures of components can completely negate the quality of the designed project. Attention should be paid during the design phase, as well as including appropriate quality control measures and field inspection to ensure compliance noted in the specifications.

8 - WOODS AND PLASTICS

Covers rough carpentry, heavy construction timber, finish carpentry, plywood, wood treatments, prefabricated structural wood and its uses and prefabricated plastics. Rough hardware, particleboard and treatment and use are also included.

General:

Materials used should be suitable for the environmental conditions and should provide a service life consistent with the planned building life. Accessibility for purposes of maintenance of the building components should be considered. Due to the high potential for decay and termite attack, it is recommended that use of exterior wood be minimized. If wood is used, thoroughly pressure treat and maintain accurate inspection to ensure proper treatment. In order to minimize windstorm damage, carefully consider connection details between wood and other materials.

Construction/Materials Consideration:

Wood materials and products are subjected to constant exposure to moisture from humidity, rain, and wind-blown spray. Additionally, boring and nesting insects, mould, and various forms of rot are constant problems. Plastics, however, are generally not affected by these problems, but constant exposure to the ultra-violet rays in sunlight can cause structural failures ranging from delamination in fibre-reinforced resinous materials [fiberglass] to actual chemical and physical breakdowns in certain plastics such as polyvinyl chloride [PVC] shapes and films.

Lumber:

Base selection of wood for exterior lumber and timber on strength and treatability; strength can generally be handled by size variation; treatability is a function of species and heartwood percentage. Heartwood of most species is almost impossible to treat effectively for termites, so selection of a wood species having high sapwood content will generally produce superior treatment results. Finished moisture content of lumber and timber relates to air humidity conditions of site, but moisture content should not be more than 19%.

Plywood:

Ensure plywood has full penetration treatment of the recommended retention for pressure treatment. External use should be avoided, but where required, use only exterior grade [marine] type. Particle Board, hardboard siding, and other similar materials should not be used as they are unstable in hot humid conditions and cannot be preservative treated. If such material is considered, use fibre-cement board as an alternative. Wood Treatments: Ensure that all construction lumber or timber is pressure treated with ammoniacal copper zinc arsenate [ACZA] or alkaline copper quat [ACQ]. Consider that lumber is structurally weakened by the pressure treating process, and additional thickness may be required in order to achieve the design load. Plywood should be similarly pressure-treated with a water-borne preservative suitable for above ground use. Prior to construction, specify that treatment of the soil beneath the proposed structure is required, with a water based soil chemical. Where fire-retardant wood is required, use a nonhydroscopic formulation, however, due to cost and maintenance, use of intumescent transparent varnish should be sparing.

Plastics:

PVC pipe is not UV-resistant and should not be used above ground in locations exposed to sunlight. ABS [acrylonitrile-butadiene-styrene] piping is UV-resistant and is used for exposed applications. Most plastics [such as acrylics and polycarbonates] used in exterior applications such as signage and glazing are UV-resistant. Fibreglass materials are not UV-resistant. After prolonged exposure to sunlight, they fade, embrittle, and delaminate and therefore should not be considered. There are no unique restrictions regarding the interior use of plastics.

9 - THERMAL AND MOISTURE PROTECTION

Covers various roofing systems and performance in climatic conditions that include prolonged exposure to direct and intense sunlight, hurricane force winds, driving rain and ground level temperatures reaching in excess of 100o F in a hot humid environment.

Design Considerations:

Materials used should be durable and suited to the environmental conditions and should provide a service life, without excessive maintenance or replacement, consistent with the planned building life expectancy. Roofs designed to accept the storage of storm water are not permitted. Skylights and/or

roof lights are not permitted due to water tightness and resulting maintenance problems, as well as their vulnerability in hurricane force winds; use of clerestory windows is permitted, however suitable protection methods to minimise damage from flying objects during hurricane events must be provided. Roof systems selected should be capable of achievement of a 15- year substrate-up, all inclusive [labour and material] manufacturers' warranty. Primary access to the roof, and all roof-mounted equipment, should be by means of a continuation of a stair well. Vertical "cat ladder" type access and/or folding ladder, with or without access hatches, are not permitted as a means of roof access. Steep slope "ships ladder" type stairs may be permitted, however only in selected locations on the roof where there is need to maintain small items of equipment or where differing roof levels, introduced by the design solution, are necessary. Fall arrest anchor mounting points should be included, and these should be coordinated by the structural design

Roofing Systems:

For the purpose of this design guide, roofing systems include the roof deck or substrate, insulation, roof membrane, vents and drains, and any other element incorporated into the system. Roofs may be pitched or flat. A flat or low-slope roof is defined as a roof field with a fall of a minimum of 1:100 [1/8" in 12", or 0.6° degrees of slope] but less than 5 degrees of slope. Greater than 5 degrees of slope [1" in 12"] is therefore defined as a pitched roof. Dead flat roof fields are not permitted, and use of tapered insulation to create slope should be avoided, however certain circumstances may require its use, in which case preference should be given to closed cell moulded expanded polystyrene [EPS] with a fibreboard lamination. Different roofing systems should be separated by a parapet or upstand or similar means of termination in order to define warranty / liability limits and maintenance concerns. The following roofing types may be considered:
1] Low-slope:
a] Cold-applied Built-Up Roof [BUR] with reflective coated cap sheet, topside insulation;
b] Elastomeric Roofing [liquid applied], spray-in insulation below deck;
c] Thermoplastic [PVC], fully adhered, spray-in insulation below deck.

2] Pitched roof:
a] "Standing Seam" type metal roof systems, however, products made of aluminum, aluminized, or otherwise treated with aluminum to a significant extent should not be selected.

Low-Slope Roof Design Guidelines:

Install the recommended roofing system only on roofs with a minimum slope as defined by building codes but not less than 1⁄4" in 12" [1:50]. All surfaces, including valleys and transverse slopes across tops of parapets, should be designed to slope to drains. A minimum of two roof drains per contained drainage area should be included. For minor roof areas the use of scuppers may be considered. Overflow scuppers should also be provided As insulation will likely be required to achieve the calculated heat resistance [R] value, a modified built- up roofing system

provides the ability to incorporate topside insulation. However high uplift pressures, which are experienced during hurricane force winds, place tremendous load on the roof, therefore only polyisocyanurate insulation [use of either extruded or expanded polystyrene is not permitted] under a stable secondary deck, such as plywood, is permitted. Moisture entrapment in the insulation is a concern, therefore the roof assembly should be carefully detailed to ensure chance of moisture becoming entrapped in the system is minimised.

Built-up Roofing [BUR]:

In BUR installations, the primary membrane should be a conventional multi-ply [3 or more plies of plasticizer modified glass felts, with a factory laminated reflective coated surface system to a minimum thickness of 160 mils, 4,000 micron], applied to the substrate by a cold-applied flood coat bonding rubberized asphalt adhesive to form a true dual layer waterproofing membrane, with upgraded EPDM/SBS flashings. Note that only fully-adhered systems are permitted for use.

Fluid-Applied Elastomeric Roofing:

Such a system, applied directly to the substrate, provides a highly reflective surface and is relatively maintenance free. Coating material selected should be a polyurethane elastomer, resistant to ultraviolet light, capable of 150% elongation and recovery and must adhere to the substrate, and should withstand ponding. Material thickness should be applied to a minimum thickness of 60 mils [1,500 micron] applied in successive 20 mil coats to prevent pin holing, with a granulated final coat to provide traction. This system should be employed in conjunction with sprayed-in-place polyurethane foam [PUF] to underside deck.

Thermoplastic Membrane Roofing Pitched roof design guidelines:

Pitched roofs should be configured so that rainwater accumulation will not cause safety or maintenance problems. Metal roof should be considered as water-shedding only, a further “peel and stick” waterproofing membrane should be provided below the outer material. Gutters should be adequately sized to accommodate water run-off from the contributory roof area, and should be located so as not to create a possibility of leakage back into the building. Rainwater leaders should be integrated into the building and tied into a comprehensive storm water drainage system, and not drained to grade.

Metal Roofing: Metal roofing should be factory coated standing seam fixed to stainless steel fasteners, clips and connections designed to resist shear stress during expansion and contraction cycles. The roofing system should be designed to resist the design negative pressure at the most vulnerable locations, such as corners and edge zones.

Insulation and Vapour Barrier:

Consider all locations to be high humidity areas where the 1% outdoor ambient dew point temperatures in excess of 70o F are higher than the design indoor dry bulb temperature, therefore insulation to maintain its exterior surface temperatures above the ambient dew point temperature should be selected. Place a continuous vapour barrier at a location where its temperature will be above the ambient dew-point temperature so as to prevent water vapour from infiltrating and condensing within interstitial spaces.

Sealants:

Because of the constant threat to structures in the hot humid environment caused by the intrusion of moisture-laden air, adequate control joints should be incorporated in the design of the structure and attention given to joints to be sealed. Sealants [preformed tapes, foams, and extrusions] should be selected based on its resistance to ultra-violet light, prolonged exposure to hot humid environments and extreme high temperatures. Selection of sealants should also be considered with regard to the planned service life of the component assembly, as replacement of sealant across significant external applications could contribute to excessive maintenance. Rubberized bituminous material, polysulfide and polyurethane sealants, and styrene butadiene rubber closure strips all show only fair to poor UV resistance. These materials should not be considered for exterior applications where they are exposed to direct sunlight Although ambient temperatures may seldom exceed 100o F in the region, portions of structures may well reach 160o F, or greater depending upon the material, when exposed to direct sunlight. Polybutene, bituminous, acrylic-latex, polyvinyl acetate latex sealants, polychloroprene [neoprene], polyvinyl chloride [PVC], and polyurethane foams, and neoprene, PVC, and styrene butadiene rubber extruded seals and closure strips have maximum recommended service temperature ranges from 130 to 180o F. These materials should not be selected where structural elements exposed to sunlight may exceed these temperatures.

10 - DOORS AND WINDOWS

Covers exterior and interior type wood, metal, and glass doors and windows; glazing; and finish hardware.

Design Considerations:

Door and Window Systems. To minimize the destructive corrosive elements found in hot humid climates that generally cause door and window assemblies to fail, select pre-manufactured systems combined with quality control during installation. Exterior doors may be composed of metal, aluminum and glass, or all glass, and should ideally be out-swinging [building codes permitting] as these generally resist water and air penetration better than in-swinging doors. Due to higher maintenance requirements, wood doors and window frames in exterior locations are not permitted and should not be used. Door and window systems that utilize factory fabrication for all components including weatherstripping should be selected. Egress

requirements for entrance/exit doors are governed by the applicable building code based on building use, occupancy load, which should also provide guidance as to minimum door height and width, maximum door leaf width, panic hardware, step down dimensions to the exterior, requirements for threshold geometry, door swing direction, illumination, operating force, signage, etc. Doors and windows are frequently problematic components of a building's thermal envelope. Typical issues include infiltration of hot humid air from the outside during operation, as well as radiated heat gain through the door and window materials themselves. Strategies to limit infiltration and improvement of thermal performance should be carefully considered.

Standard size:

Where possible, industry standard door sizes should be utilised, preferably 30/70 doors [i.e. 3.0 ft wide x 7.0 ft high x 13⁄4" thick]. Full height [e.g. 9 ft] doors should not be used as the additional weight imposes higher loads on hardware and in the case of wood doors, the leafs are more susceptible to warp. Clerestory fanlights or transom over panels set within the frame may be considered. Hardware and Louvres: Provide all metal exterior and interior doors with template hardware. Louvered doors in exterior locations are only permitted in non-conditioned spaces, such as mechanical rooms, and only where there are no other means to provide the venting function. Where used, only doors with factory-installed louvers, which should be drainable, weatherproof and factory-primed are permitted.

Interior Wood Doors:

These are preferred for use as their construction and assembly is more likely to meet the STC ratings imposed. Door leafs should be hardwood-veneered, stile and rail solid-core doors, capable of achieving a fire-rating of 20 minutes and an STC of 50, unless security requirements for a particular entry cannot be met with this type of door. Wood doors should be finished with stain and a clear sealer. Premium-grade solid hardwood should be used for doorjambs, stops, and casings. Ideally, in order to achieve consistency, wood veneer species should be coordinated with other wood elements, such as that used in millwork. Where doors are a part of sound locks, the doors should be overlapped and gasketed, and finished with an absorptive finish, ensuring appropriate STC rating is met. Use of sidelights at office doors should be considered for light transmission and allowing others to determine if the room is occupied.

Hollow Metal Doors:

These are generally used for utility rooms, service rooms, mail rooms and exit doors, in areas subjected to above-normal traffic or physical abuse, and where required by local codes and ordinances. Metal doors used in internal locations should come with a glass inset vision panel of 4" wide by 25" long, and seals around the edges. All metal doors and frames are to be completely factory finished and humidity, and weathering tested. Metal covered wood core doors should not be used since the sheet metal cladding is lighter and subject to faster

deterioration. Where sound transmission qualities are required, specify composite construction steel doors with a Sound Transmission Coefficient [STC] rating appropriate to the room location, however take note that the entire door assembly, including frame and architrave detail, will be required to meet the STC requirements.

Fire-Rated Doors and Frames:

Strict requirements for fire doors and frames [i.e. labeled doors] preclude changes or modifications except when approved by the fire protection engineer. However, to assure maximum protection for fire doors with ferrous metal components, ensure all such metals are hot-dip galvanized; and, in addition, frames are shop primed. Where possible, consider pairing a fire- rated wood frame to complement the wood door leaf.

Glass Doors:

Where design or the aesthetics dictate solid glass or metal framed glass doors, frames are stainless steel, type 304 or 316 in 12, 14, or 16 gauge, polished and finished except where the exterior doors are in a well protected area in which case aluminum [clear anodized after fabrication] may be considered.

Plastic Laminate Faced Doors:

Plastic laminate covered doors should be used primarily for interior doors of lesser importance, including doors into inner rooms; however, the plastic laminate should be a wood species coordinated with the wood used elsewhere. Depending on location, these doors may be hollow or solid cores, with high pressure decorative laminate facings on all exposed edges.

Emergency exits:

Doors should be self-locking and equipped with a remote alarm and magnetic locks or electric strikes connected to an alarm/time-delay mechanism. Electric locking systems on fire doors should be connected to battery-backup power and emergency generators. The systems are to remain locked from the outside during a power failure. Emergency egress doors should not have any exterior hardware, and exposed hinges should be “peened” [i.e. the pin cannot be removed by pulling it out] to ensure the security of the doors.

Windows

Window Selection:

Windows and glazed entry doors [where used] should be selected to meet or exceed the required thermal and hurricane resistance performance requirements. Neither jalousie type

windows, nor wood, fibreglass or plastic windows will be permitted. Where selected for use, operable windows should be carefully coordinated with the mechanical HVAC design, and consideration should be given to situations where vents may be left open, thereby allowing infiltration of hot humid air. Where used, vents should be of the awning or projecting type, and suitable for cleaning from the inside. Windows should be double-glazed hermetically sealed units, and equipped to control heat gain/loss, brightness, glare, noise, and dust infiltration. A means of darkening the room must also be provided. To prevent distraction and increase security in the courtroom, higher windowsills or clerestory windows are more desirable. Study sun angle patterns and consider use of shading devices and and/or setbacks to allow the glazed areas and day lighting influence to be enhanced, without compromising the thermal and/or hurricane resistance performance requirements. Where necessary provide additional treatments, such as tinted glass.

Hurricane resistance:

All windows and penetrations in the external envelope [e.g. louvers] must be either missile impact resistant, as defined by Miami-Dade County or be capable of protection from wind-borne debris by secondary means such as shuttering. Although plywood shuttering is an effective means of shuttering windows and other vulnerable openings against hurricanes, it is a time consuming exercise to undertake in an impending storm, therefore where non-impact rated windows are selected, consider use of building-integrated roller shutters that are capable of being operated from inside the building. Where these are considered for use, ensure that the units are contained within the building, such that the operating mechanisms, fixing points, guide rails and tracks, etc. will not corrode and lead to surface staining.

11 - FINISHES

Covers gypsum wallboard [drywall], plastering systems, acoustic tile, and metal ceiling suspension systems; flooring materials; and paints and stains, including protective coatings.

Design Considerations:

The general problems encountered after the design selection and installation of most finish materials are moisture infiltration, condensation and ultraviolet ray deterioration [of exterior finishes]. As an example, the primary cause of the impairment of a metal suspension system for ceilings is the high humidity level. All metal items are susceptible to “sweating” under this condition. The slightest difference in the temperature of the metal and the surrounding air temperature and dew point will condense moisture on the metal. If the metal is a ferrous metal, the subsequent rust and stain create a maintenance problem with the materials. Therefore, it is imperative that continual awareness of the above addressed problems be maintained during the design stage.

External coating Systems

Paints and Stains:

Because of the severity of the environment [high solar radiation, high temperatures, etc.], paints frequently do not perform well. Mildew defacement and deterioration of paints may occur rapidly if preventive measures are not taken. Careful consideration should be given to the selection of the external coating system, ensuring that the coating system will perform satisfactorily in a hot humid environment, with minimal maintenance. Coating systems generally should be selected by its ability to resist moisture and rain intrusion, mould growth, dirt and grime build-up, as well as accelerated weathering. A blended synthetic coating system comprising cement based plaster and resin bonded high quality acrylic paint formulated for use in hot humid climates, with Teflon additive to improve dirt and grime run-off, should be considered. Sufficient control joints to minimize structure-related cracking should be included.

Exterior Insulation and Finish Systems [EIFS]:

These systems, consisting of an insulation board with integral scrim and synthetic plaster finish, are sold as a "complete system" by numerous firms. They have the advantage of providing a "plaster" exterior with integral insulation. They should only be applied to concrete and masonry surface substrates and adhered only by manufacturer-approved installers. Use these materials as a combined exterior finish with built-in layered insulation board, thereby achieving two separate functions: providing the finish plus insulating, which contribute to an energy-efficient building.

Paint:

Carefully consider selection of coating to exterior walls and relationship of vapour barrier. If a high permeable coating to interior wall surfaces is applied ensure that any water vapour that passes through the exterior coating and vapour barrier enters the air-conditioned space and does not remain trapped within the insulation and wall material. Where solvent-based paints are selected for use, they should be formulated with low VOC emissions and not with formaldehyde, halogenated solvents, etc. or tinted with pigments of lead, cadmium, or with more than 10% aromatic hydrocarbons by weight.

Substrate Preparation:

Where concrete masonry units are used, problems with water infiltration and mould growth could arise. Surface preparation of concrete and masonry surfaces should be carefully considered. Efflorescence [white to gray powdery products] may occur on concrete surfaces, especially on un-insulated interior walls of air-conditioned buildings, steps should be taken to control this. Where moisture migration through concrete or masonry walls from the outside to

the inside may present a problem, consider sealing the outside with a surface conditioner or concrete primer.

Walls

Gypsum Wallboard:

Skim coated gypsum wallboard may be considered for both walls and ceilings, however care should be taken at the earliest stages of the design to avoid telegraphing of joints, furring, battens, studs, etc. Telegraphing occurs as a result of light [natural or artificial], usually at the opposite side of the space, bouncing off a skimmed wall or ceiling, therefore lighting arrangements should be carefully considered at the earliest stages of design. Where wallboard is being used, and it is intended to attach fixtures and fittings [e.g. tack boards, projection screens, LCD TV monitors, etc.] continuous blocking between studs or other types of reinforcement may be necessary. Consideration should also be given to window treatments, particularly with regards to locations where blinds may be required. The use of polyvinyl chloride [PVC] reglets, trim, stops, screens, vents and expansion joints, as well as creation of false work and bulkheads may be considered. Although 1⁄2" [12mm] thick board may be used in some areas, minimum thickness of 5/8" [15mm] is preferred. Deterioration through absorption of moisture must be considered. Abuse resistant wallboard should be considered in public spaces, and other areas where intentional damage to walls is a reasonable possibility. Where used in other ceiling elements, such as soffits, perimeter coves, recesses, and reveals, shall be provided as required to integrate HVAC, lighting, and sound systems into a harmonious design.

Fibre-Cement Board:

Fibre-cement board, is fire-rated, asbestos-free, and highly resistant to impact, rot, and moisture. Installation materials and methodology are similar to gypsum wallboard. Its high impact resistance makes it an excellent economical alternative where the potential for damage precludes gypsum wallboard, such as "back of house" areas and high humidity areas such as kitchens. Cement- fibre board is also suitable for exterior soffits.

Wood Panelling:

Consider flame spread, fuel contributed load and developed smoke ratings against code requirements. Paneling should be either plastic laminate or premium-grade hardwood veneer stained and finished with a transparent sealer mounted, either mounted onto a plywood core. The technique of "book matched" panels should be limited to small areas of highlighting and not for overall rooms or systems, and only where finished walls will remain exposed. Where panels are used internally, but on exterior walls, carefully consider vapour barrier locations. Consider ease of removal of panels, including expansion joints, and clip systems.

Render and Plaster:

Where plaster is used in building interior, only use of smooth float finished Portland cement plaster will be permitted. In long runs, consider introducing control joints at 10 ft [3m] intervals. Consider damage to corners and chair backs, and consider mitigation steps such as use of corner guards and/or chair rails.

Flooring Generally:

Non-slip materials should be selected at entrances, base of stairs, stair treads and ramps. Any flooring that requires maintenance, such as polishing and/or waxing, should be carefully considered, particularly with regards to availability of materials, prior to selection. Any floor access panels should be waterproof and double sealed. Where flooring meets dissimilar materials, the use of metal edge strips is to be considered. Where dissimilar floor materials butt and exceed 1/8" [3mm] in height, consider use of a tapered transition strip. Ideally all floor finishes should terminate at the centre line of a door threshold.

Wood flooring:

Wood or laminate type flooring laid directly onto substrate should not be considered for use. Resilient wood flooring [such as engineered flooring assembly] with hardwood MC of 8% may be used in selected locations where less footfall traffic is expected, however where installed on to concrete substrate use of a vapour barrier should be considered. Expansion joints at perimeters and other permanent fixtures should be provided.

Tile:

Tiles selected should have a verifiable non-slip finish, and where installed over concrete or other cementitious substrate, a thin-set mortar should be used. Applying tile onto a wood substrate is not permitted and should be avoided. In large fields, control joints should be made at 10 ft [3m] to 15 ft [41⁄2m] in all directions, based on the room size and tile layout. If columns present, control joints should ideally be aligned with column spacing. Use of grout-less, butt jointed tile should be considered in all public areas. In wet areas, such as toilets, use of epoxy grout should be considered.

Carpet:

Where carpeting is considered for use these should be secondary-backed carpet tile with a pile weight in excess of 950 g/m2 [28 oz] installed with a rubber-coated pad, and warranted for ten year commercial wear. Darker colours, e.g. blue/grey or green/browns should be considered.

Resilient flooring:

Vinyl-composite tile [VCT] or sheet vinyl [e.g. linoleum] should not be selected for use in toilets or rooms other wet areas. Tile should be installed with low VOC adhesives, and should include a rubber baseboard to 4" [100mm] height. Polished concrete floors may be considered in selected locations.

Ceilings

Acoustical Tile and Metal Ceiling Suspension Systems:

Only non-combustible acoustic tile should be selected. Ceiling suspension main runners and cross runners, including wall channels, miscellaneous moldings and accessories, are an aluminum alloy and finished as applicable, except where fire-rated installation is a requirement. In fire rated areas, a concealed grid system with galvanized steel, factory finished with baked enamel, should be used. Ceiling tiles should permit access to ceiling spaces where mechanical or electrical distribution systems are located.

Installation:

Dissimilar metal installation must include standard preventive measures against electrolytic corrosion. Ensure that all aluminum material has a minimum paint coil coating of 0.7 mil thickness. Where aluminum is in contact with concrete or masonry, coat the aluminum contact surface with bituminous paint or, where appearance is a requirement, a paint system consisting of a chromate primer and two- coat enamel finish. All nails, screws, bolts and fasteners should be stainless steel or aluminum. Aluminum for securing suspended ceiling systems onto concrete or masonry walls should not be used.

12 - SPECIALITIES

Covers louvres and vents for exterior conditions, sun control devices, signage and display boards, toilets and accessories. Louvers and Vents for Exterior Conditions: It is recommended that all louvers and vents be aluminum, 6063-TS or 3003 alloy, welded or fuse welded frames, with an anodized coating of not less than 0.7 mil. Blades should be drainable and storm proof type. Design structural framework for wind loads occurring within the various areas of the tropical zone.

Signage:

External signage materials should be fibre-reinforced, internally coloured resinous plastics. Consider that bright colors may fade when exposed to constant sunlight. Acrylic plastic and phenolic resin should be used for interior purposes only. Letters and symbols should be silk-screened onto sign faces. Graphics should be well-defined baluster arrangement with point size appropriate to location and room space, but should be viewable from not less than a distance of 10 ft [3m]. Room signage plaques should be capable of inter-changeability and in certain room functions [e.g. meeting rooms] a clear plaque should be provided to allow standard printed text on bond paper to be inserted. All signage should be mechanically attached, fastening of signs and plaques using contact adhesive or tape will not be permitted.

Whiteboards:

Where used, should be of porcelain enamel factory baked on to sheet steel, with the writing surface formulated for use with erasable felt markers. Aluminum backing should be used, specifying that the porcelain enamel be applied to both sides of the substrate and that mounting holes be made before baking, in order to adequately protect the substrate. Boards should be white, and coordinated generally [size, appearance and location] into the room in which they serve. Frames should be stain finished anodized aluminum, and mounting brackets and fasteners should be of the concealed type. Map hooks and a continuous marker tray should also be provided.

Tack boards:

Where used, should be vinyl weave fabric covered with sound absorbing fibreboard core. Boards should be coordinated generally [size, appearance and location] into the room in which they serve. Frames should be stain finished anodized aluminum, and mounting brackets and fasteners should be of the concealed type.

Projection screens:

Where used, should be fibreglass lumaflect glass beaded matt white viewing surface, and electronically operated. Screens should be coordinated generally [size, appearance and location] into the room in which they serve.

Sun Control:

Interior and exterior sun control devices are categorized as interior blinds, both metal and woven fabrics, and woven fibreglass screens. Limit metals for sun control devices to prefinished aluminum with a minimum thickness of 0.032 inch for recommended spans. Fibreglass woven fabric should be rot- and weather-resistant, colourfast, dimensionally and thermally stable and fire retardant where and when required.

Toilet Compartments:

Partition division panels should ceiling hung with stainless steel fixings and either sheet metal with baked enamel finish, or plastic laminate covering over plywood. Plastic covered solid plastic phenolic resin core for compartment divisions may also be considered. Cubicle doors and urinal screens should material should be selected to match partition division panels. Toilets and urinals should be low-flow self-flushing [dual flush, 3 or 6 litre flush cycle for toilets, 3 litres for urinal].

Toilet Hardware and Accessories:

Washroom equipment should be constructed from stainless steel, with all stainless steel moving parts where required and with concealed mountings for vandal-proof installation. Supplied accessories should generally consist of: toilet paper dispenser, paper towel dispenser, soap dispenser, large size waste receptacle, feminine napkin disposal receptacle, grab bars with peened grip in disabled toilet, mirrors, fold-up infant change table

13 - EQUIPMENT

There are no unique requirements for equipment. Carefully examine manufacturers' technical literature to determine what, if any, options are available and to specify those [such as stainless versus galvanized steel and special factory-applied coatings]. Look for manufacturers' statements about suitability for use in hot humid climates.

14 - FURNISHINGS

Covers manufactured casework.

Design Considerations:

The interior portions of buildings that are properly ventilated are not as adversely affected by the tropical elements. Of major concern is the potential environmental conditions that can cause some interior surfaces, such as smooth-faced cabinetwork, to be affected by fungi. Construction/Materials Consideration Wood: Use paint with mildewcide additives for all wood-fabricated items where paint finish is required.

Protective Coatings:

A prefinished factory-applied protective coating is recommended especially where cabinetwork may be subjected to outside environment intrusion.

Particle Board:

Because of high-humidity, do not use particleboard for furniture, millwork, and cabinetwork destined for use in areas or high humidity. Tempered or high- density hardboard is suitable for drawer bottoms. In plastic laminate covered cabinets, back doors with plastic-laminate backing sheets. Require non- ferrous metal fasteners, fittings, and hardware wherever possible.

Plastic Laminates: Generally, plastic laminates used in cabinet and casework perform satisfactorily in the tropics. However, thin-film decorative vinyl laminates will not; prolonged humidity causes blistering and delamination and they will fade when exposed to direct sunlight.
15 - SPECIAL CONSTRUCTION

16- Mechanical

Covers plumbing, air conditioning, and other mechanical systems.

Design Considerations:

Exterior ambient design condition for the region averages around 90o F with 75% RH, therefore there is a requirement to provide year-round cooling. Thermal comfort of the building occupants is crucial to the success of the buildings. As by far the largest consumer of power in the building, the challenge is to provide an indoor environment at a comfortably cool level, whilst maintaining sufficient ventilation air for occupant health and within an acceptable humidity envelope, as efficiently as possible in order to keep utility costs down. It is expected that a central chiller and a Dedicated Outside Air System [DOAS] will be required. One technique to reduce energy consumption while maintaining adequate air quality, is demand-controlled ventilation. Instead of setting throughput at a fixed air replacement rate, carbon dioxide sensors are used to control the rate dynamically, based on the emissions of actual building occupants. To minimise entrainment of hot humid outside air, the building should be positively pressurised. Re-use of exhaust gases to a heat recovery system should be considered. The use of economizers is not permitted.

Note: Space requirements for the ventilating and air conditioning systems should be coordinated with the preliminary architectural studies ensuring ample space is provided for mechanical equipment, servicing of equipment, and duct shafts. Space should be allowed for expansion, if necessary. Where possible, airhandling units should not be suspended above ceilings. Each AHU should be located in a mechanical room. Noise control and sound isolation should also be considered. Wherever possible, locate mechanical equipment rooms so that they open to outside, to allow for service without disruption to building occupants. However, when mechanical rooms are so located, rooms should be sealed, with one to two air changes/hour of conditioned air to slightly pressurize the space, room temperature should be maintained. Exhaust all air supplied to the mechanical spaces through room infiltration.

Air Conditioning:

The basis of design analysis should include the use of air conditioning systems such as variable-volume constant-temperature, variable-temperature constant- volume, and terminal-air blenders. In addition to first-cost and life-cycle cost considerations, base systems on the capability of the air conditioning system to control the humidity in the conditioned spaces continuously under full-load and part-load conditions. Use of a chilled water system should be considered. Use of direct expansion [DX] systems should only be considered in areas capable of controlling the dew point of the supply air for all conditions of load. An air distribution system with variable air volume devices to control air supply [including use of under floor air] may be considered, however, separate zoned thermostat controls should be provided. In areas subject to solar exposure and heat gain/loss characteristics, individual thermostatic controls should be provided. All diffusers, registers and grills should be capable of individual adjustment. The ventilation system should be flexible and with spare capacity to allow for future building changes.

Energy Analysis:

Support system selection by an energy analysis computer program, in accordance with energy conservation design guidelines set out in LEED. Evaluate latent heat gain due to vapour flow through the building structure and air bypassed through cooling coils, and the dehumidification performance of the air conditioning system under varying internal and external load conditions to ensure proper system performance. The computer program should include a printout of the space temperature and relative humidity under various internal and external loads

Equipment:

Air Cooled Packaged Chilled water systems should be provided with two aircooled, packaged chillers, connected in parallel. The cooling capacity of chilled water systems should be divided between two chillers to ensure reliability and constant chilled water supply without temperature fluctuations and to prevent short cycling. Ensure that the combined capacity of the two chillers does not exceed the total requirement including diversity. Consider temperature rise in supply pipe to the most remote coil to ensure proper coil dew point in selection of chilled water supply temperature. Chillers should be provided with reciprocating, accessible hermetic or semi-hermetic compressors, and there should be no less than two but no more than four compressors per chiller. Compressor speeds should not exceed 1750 RPM.

Each chilled water system should be supplied with two split face double suction chilled water pumps connected in parallel. Each pump sized for 50% of the total system flow, at the total system dynamic head.

Air handling units should be selected with chilled water coils for 44o F entering water temperature with a 12o to 16o F water temperature rise. Units with 100% outside air should have cooling coils selected at a 20o F water temperature rise. Air handlers with an outside airflow in excess of 25% of the total airflow should be provided with reheat and humidity controls. Heat recovery may be double-bundle condensers or separate, auxiliary condensers; run-around closed-loop; or refrigerant hot gas. Use electric reheat only when critical space conditions must be maintained or in variable air volume terminal units to prevent over cooling of space. Temperature and/or humidity may be required to be maintained round the clock in selected areas, where this is a requirement, consider grouping cooling loads into a single air handling unit.

Motors and starters should be selected not to overload at any point in the operating curve of the driven equipment.

Air handling and ventilation fans should have sealed bearings. Fan shafts for all fans should be stainless steel. Pump shafts should be stainless steel. All ventilation fans should be sourced from the same manufacturer. Casings for curb mounted fans and gravity ventilators should be spun aluminum, casings for utility vent sets and axial fans should be steel. Centrifugal fan impellers should be aluminum and should have integral inlet orifice plates. Fan wheels with loose blade ends are not acceptable. Axial Fans should have cast or all welded impellers. All fan assemblies should be statically and dynamically balanced.

All filters [during construction and operation] should be pleated type with 55% or higher efficiency rating. Motorized dampers should be provided to all outside air intakes. These dampers should close automatically when the unit is off. Dampers should be constructed of stainless steel or aluminum only.

Where direct-expansion systems are considered for use, the compressor, evaporator, and condenser should be provided with the necessary accessories to ensure proper oil return and uniform circuit distribution at minimum coil load. Consider the need for unloading, vertical split-row coils, backpressure regulators, and hot gas bypass.

Chilled Water and Condensate Piping:

Non-corrosive or corrosion-resistant piping such chlorinated polyvinyl chloride [CPVC] pipe with glued joints should be selected for chilled water service and condensate piping. All ferrous materials used for pipe hangers, anchors, and other supports, should be hot-dipped galvanized. Any damaged surfaces or joints should be touched-up with a field applied zinc-rich compound.

Ductwork:

Galvanized sheet metal should be selected, and should be designed and constructed in accordance with the latest edition of Sheet Metal and Air Conditioning contractor's National Association, Inc., manual [SMACNA] low or high velocity as applicable. All wall penetrations should be sealed with mineral wool or other non-combustible material. Approved fire dampers should be located at all penetrations of fire rated walls, floors, and ceilings. In addition, smoke dampers should be provided in all ductwork that pierces smoke partitions.

Insulation:

Prevent condensation and subsequent problems of moisture absorption, mould formation, and corrosion, by ensuring that all materials and equipment operating at temperatures below the maximum ambient dew point temperature are properly insulated and sealed with a vapour barrier. All insulation should have a system fire and smoke hazard rating. The system rating should be based on insulation, jacket, adhesives, coatings, fittings, and cements. Any treatment of jackets or facings to impede flame and/or smoke should be permanent. The use of asbestos containing material is prohibited. Consider conducting a heat transfer analysis of the temperature profiles through the typical wall and roof sections.

All condensate, chilled water, and refrigerant suction pipes and fittings should be insulated. All external or exposed-to-weather chilled water piping should be insulated with a foam glass protective covering, and only be applied by an approved subcontractor. All refrigerant suction pipes, hot gas pipes and/ or condensate pipes [including valves, valve stems, gauge stems, strainers, and fittings where possible] should be insulated with minimum 3⁄4" [20mm] specialist pipe insulation.

All air ducts and plenums should be insulated and insulation thickness should be selected to prevent condensation on the surface of insulation when the ambient relative humidity is 90% at the maximum difference between the ambient air temperature and the supply air temperature. Minimum thickness of supply-air or return-air duct insulation should be 11⁄2" [40mm] nominal. Exhaust ducts in concealed spaces subject to high ambient humidity should be insulated. Insulation should be continuous through all openings, but should be interrupted at fire dampers.

All pieces of equipment with surface temperatures over 120° F [48° C], or with surface temperatures causing condensation at ambient relative humidity of 90% should be insulated, using same type of insulation as specified for chilled water, etc.

Location:

Roof mounted equipment may be considered, but should be fixed to a platform, not directly to the roof. Consider damage to equipment due to flying debris caused by tropical storm or hurricane force winds. Equipment should be located indoors whenever possible

General:

Ensure circulation of conditioned air is provided throughout enclosed spaces. All spaces are to be cooled, including washrooms, storage rooms, etc. In order to reduce cooling load, excess air from air conditioned spaces may be used to make up air exhausted from the washrooms and other similar areas, however, cooling load to washrooms may be omitted from sizing of air conditioning equipment.

Controls:

Consider the following when designing the air conditioning controls: a] When reheat is used with systems controlling humidity, let the thermostat control the flow to the cooling coils under normal conditions. On an increase in humidity, the humidistat overrides control of the flow to the cooling coils and, simultaneously, the thermostat assumes control of the reheat coil to prevent over cooling. b] Whenever possible, provide modulating, in lieu of on/off controls. Provide proportional-derivative- integral controls in lieu of simple proportional controls, when space temperature and humidity must be maintained within narrow limits. c] Specify chillers and air conditioners with hot gas bypass on the last stage when the anticipated air conditioning load may drop below the lowest stage capacity of the unit.

17 - PLUMBING

Design Considerations:

Domestic water supply should pass through a meter before reaching a booster pump [pump characteristics are as described above]. A dedicated service riser should be considered with water storage tanks located on the roof, or within the roof space. Risers should then be provided to each washroom location. Hot water may be by means of instantaneous water heater, or roof mounted solar water heater.

Plumbing Fittings and Fixtures:

Vitreous china fixtures should be selected. Under counter mounted basins should not be considered, as they are easily damaged and require additional maintenance. Under counter storage cupboards should not be included, however care should be taken to conceal the trap. Where used, counters around the basins should be formed in plastic laminate with a marine plywood core; use of particleboard will not be permitted. Consider post forming or rounding the counter edges and nosing. Taps should be low- flow fixtures, with automatic shut-off. Only low water flow consumption fixtures should be considered. All fixtures provided to each urinal flush valve and basin should be hardwired infra- red sensors, and should be vandal-proof and of institutional quality. Use of battery-operated sensors will not be permitted. Flush tanks for urinals will not be permitted.

Storm water:

All storm water drain lines should be collected centrally and stored for grey- water reuse. Tie in to local storm water network should be at a manhole, junctions would not be permitted.

18 - ELECTRICAL

Covers power systems, fire alarms, technology [audio visual, data and ICT], photovoltaics, lighting and controls.

Design Considerations:

The electrical system should be fully integrated into the design of the building. Hurricane driven winds causes extensive damage to overhead pole lines and insufficiently protected switchgear, transformers and circuit components. Provision of secondary or tertiary power sources that automatically come on- line if utility power fails should be considered. The electrical power distribution should be available throughout the building and should be available for both general usage as well as AV/ICT usage. The electrical system should be flexible and with spare capacity to allow for future building changes. Ample power, data and network outlet locations should be provided. The lighting design should be consistent with a highly satisfactory indoor environment, be of institutional quality and provide a long building systems service life, be efficient and cost effective for operation and maintenance, be designed to provide low operating and maintenance costs for the life of the facility, and be composed of environmentally friendly and recyclable materials.

Ambient Temperature:

Give due consideration to high ambient temperatures when specifying and sizing electrical equipment. Derating of components is necessary where normal operating temperatures exceed 86 degrees F, such as rooftop installations and the interiors of protective enclosures. Derate outdoor transformers in accordance with ANSI temperature loading guides. Precautions such as ventilation fans may be necessary to assure reliable operation with long service life.

Primary supply:

A 115/230 V 50 Hz open delta three phase 4 wire supply is required. Note that some islands may be supplied at 110 V 60 Hz. Frequency converters should be considered.

Back-up power:

Where secondary power is deemed to be a necessity, engine driven generators may be considered, however, where used these should be capable of carrying full building electrical

load [except elevators, where used, and non-critical air conditioning load], and should have an energy source capable of supply for a period of three days [72 hours] after the loss of utility power. Such generators by their inherent critical nature must be protected from the elements by installation in an enclosed room. Exhaust pipes, mufflers and standard weatherproof housings installed outdoors will not provide satisfactory service life in the hot humid environment.

Photovoltaics:

As a renewable energy resource, use of photovoltaics is encouraged and building integrated photovoltaic [BIPV] modules are preferred instead of systems attached to the building. However, a cost benefit analysis on building integrated photovoltaic modules should be prepared taking building orientation and insolation into consideration, and where deemed viable these systems should be included in the building infrastructure [e.g. integrated into the roof assembly, thin-film collectors within the window panes or modules incorporated into solar shading devices]. Such analysis should carefully consider issue of energy storage, that is whether a grid interactive system should be employed [if such interconnection is permitted] or stand-alone or a hybrid [including a genset-PV hybrid]. Should a stand alone or hybrid system be considered, only sealed lead-acid [VRLA] deep cycle batteries should be selected, and these should be properly sized based on critical current to be carried and should be voltage controlled. Battery banks should be stored in an appropriately fire-rated, vented and climate controlled space maintained to 77oF [25oC] and should be designed to achieve 50% depth of discharge. Suitably sized sine wave inverters connected both in series and parallel and governed by load switches should also be considered, these should be able to maintain frequency over a variety of input conditions and capable of smoothing out harmonic distortion and output peaks.

Distribution Transformers:

Consider low-tension supply to utility company owned pad-mount type transformer equipment located in a dedicated vault or transformer room. Metering should be on low-tension side taking advantage of any favourable metering rates the utility may offer at present or in the future. The utility should retain responsibility for maintenance of the transformer equipment. The transformer vault or room should be accessible externally, well ventilated, and the room should be lockable. The room should be sized to be capable of taking two pad-mounted transformers arranged in an open delta configuration; safety and maintenance clearances should also be considered and maintained.

Data And Communications Supply:

Voice over Internet Protocol [VoIP] compatible systems should be provided, therefore no requirements to reach PBX sites for telephone connections need be allowed. Provision for a distributed data network should be made. Provision of supply point for cable television connection should be made. A dedicated fire-rated data equipment room [DER] should be provided, and in larger, multi-storey buildings [3 or more storeys], a fire-rated data sub room [DSR] per floor should be included, ideally as part of the building "core", stacked above DSR's and/or DER below and accessible from common areas. Rooms should be located so as to ensure that no data or communications outlet exceeds 295 "cable feet" from the DSR on that floor. Cable feet is the actual length of cable, following lines of walls, vertical rises to reach cable trays, runs along cable trays or ceiling plenum, etc. Unrelated building services, such as piping or ductwork, should not pass through these rooms. The rooms should be maintained between 18oC to 24oC [64oF to 75oF] with relative humidity maintained at around 50%. In order to keep the rooms under positive pressure, at least one air change per hour should be provided. Data and equipment rooms should allow for racks with a concentrated load of 900 kgs [2000 lbs] which will contain local area network [LAN] switches, optical fibre cross connects and communications gear. In order to prevent electromagnetic interference, these rooms should not be located near to photocopy rooms, or rooms containing transformers, motors, etc. Ladder type cable trays may be used, and should originate from the DER or DSR. Cat 6 cable should generally be used, and should be colour coded to distinguish structured cable from electrical cable and/or other wiring.

Lightning protection:

Lightning protection should be considered on a case-by-case basis, depending on the exposure of the building and building code requirements. Where required, protection networks are to be incorporated into the building design, and not as an add-on.

Equipment:

Installing electrical associated equipment under building eaves or canopies, within enclosed equipment rooms, and on the prevailing downwind sides of buildings contributes to a more durable system with less maintenance costs. Locating switchboards, panel boards, starters, motor control centers and other major electrical items indoors improve system reliability during hurricanes and reduces the need for expensive enclosures. All electrical supports, cable trays, hangar rods, pull boxes, etc. for internal use should be galvanised or enamel painted over corrosion resistant primer. Panel boards, distribution centres, motor control centers, and other cabinets should be factory finished in alkyd high gloss enamel paint over corrosion resistant primer.

Power outlets:

A suitable number of power outlets, offering both 110v NEMA5 15 amp Type B style and 220v BS1363 13 amp Type G style receptacles, should be provided for all user equipment determined for each room or space. Where no determination is made, provision should be based on a minimum circuit density of one normal powered pair [as described above] outlet per 30m2 [325 sq ft], and one emergency powered pair outlet per 60 m2 [650 sq ft]. Power outlets at a rate of no more than 3 outlets per circuit should be included for all areas.

Wiring Systems: The climatic conditions in the region are such that all non-enclosed locations are classified as “wet” locations as defined by the National Fire Protection Association, Inc. [NFPA] No. 70, National Electrical Code [NEC]. All electrical wiring and network cable systems should be identified and tagged, both during design phases and construction, as it is considered that this will facilitate standardisation and maintenance on all buildings.

Switchgear:

Enclose switchgear in metal. Include all switchgear enclosures with thermostatically controlled space heaters for humidity control. Due to fewer exposed contacts, primary vacuum breakers are recommended over air breakers or fusible interrupters. Seal control relays where provided in dusty or humid environments.

Switchboards and Motor Control Centers:

Switchboards and motor control centers may be of the standard manufacturers design. It is recommended that all switchboards and motor control centers be installed in enclosed buildings. If installed outdoors, provide a fibreglass housing. Standard factory-finished ferrous weatherproof housings do not provide satisfactory service life.

Panel Boards:

For panel boards use the circuit breaker type, copper bussed, located in the interior of buildings or within enclosed spaces. Use bolt-on rather than plug-on breakers to minimize contact corrosion problems. If a panel board is located on the exterior of a building, provide a fibreglass enclosure around the panel board. Standard rain caps on factory modified panel boards do not afford sufficient protection against driven rain.

Cathodic Protection:

Provide cathodic protection for underground ferrous pipelines and storage tanks and steel [sheet] piles. Cathodic protection systems may be of the sacrificial anode, rectifier type or a combination of the two. Locate rectifier control boxes in enclosed rooms or within fiberglass enclosures with ventilation provisions where separate dedicated rooms are not available. For connections to tanks and pipelines use the exothermic weld types to prevent contact corrosion.

When performing calculations, use in-situ resistivity test results since ground resistivity in the tropics varies from high [dry coral] to very low [volcanic clay].

Lighting Requirements:

Only captively held lensed luminaires with high efficiency ratings should be used. An ambient level of 300 LUX should be provided throughout the space by direct, indirect, or direct / indirect overhead lighting systems. Supplementary task lighting should be provided at workstations to increase lighting over task areas to meet the required illumination levels. The minimum life expectancy for all equipment and components associated with lighting and lighting control to be used is 25 years. This means replacement parts must be available for this same period of time following installation. The quality of components and assemblies is critical so that the systems retain their structured integrity, pleasing appearance and photometric effectiveness throughout their life. All lighting systems are to operate from separate and dedicated lighting panel boards.

Lighting systems:

Luminaires [1ft x 4 ft] should be the most commonly used light source, and where used, should be used with T8 lamps and electronic ballasts with added specular reflectors as necessary. Where design requirements necessitate [such as rooms with high ceilings and greater illumination requirements, e.g. court rooms], fluorescent T5 High Output lighting systems may be used in preference to high intensity discharge [HID] lighting. Compact fluorescent lights [CFL] should be specified in lieu of incandescent lights, however dimming
should not be considered. Induction lighting should be considered in locations where it would be difficult or impractical to replace standard fluorescents or HID halide lamps.

Halogen recessed down lights and/or track mounted lighting may be considered where fluorescent lighting would not satisfy design requirements, particularly where wall washing, down lighting, highlighting and/or spotlighting may be contemplated. Vertical orientation compact fluorescent source recessed down lights should be avoided, however, if a particular application warrants inclusion, round shaped opening luminaires should be selected and ensure that excessive heat does not diminish the lifespan of the lamp. The luminaire should not rest on the T-bar, but should be physically secured to structure.

Lighting Controls:

In order to maximise energy savings, consider use of an Intelligent Automated Lighting Control System providing occupancy information to the building automation systems [BAS] system that will be used for the efficient control of mechanical equipment and systems. The configuration / scale of the system being considered should balance the capital and operational costs against the expected energy savings and calculated payback period, whilst also considering long term support for the system, expandability and sustainability. Calculations should be based upon the

final proposed lighting power densities and current energy rates. Should cost benefit analysis prove such a system to not be viable, consider in the alternative that many lighting control needs can be met by simple sensors working in isolation, therefore all rooms should be fitted [as a minimum] with either manually operated on-off switches and/ or occupancy sensors to reduce energy consumption. Generally, lights should be controlled on a zone basis and should not have individual control implemented; instead occupancy sensors should be widely used to turn general area lights off [excluding emergency lights] when such a space is not in use. Such areas include intermittently used rooms such as washrooms, photocopy rooms, rooms used for storage and stairwells. Control devices and components should be located in electrical rooms and must be accessible. Locating dimming controls or other components that need to be accessible, in high ceilings will not be permitted. All emergency power devices should fail or return to “ON” mode, such that emergency lighting is on in the event of a power loss.

Rooms With Video Conferencing And/Or Projectors:

Basic design criteria for total lighting load are 1 watt per 1 sq ft. The lighting system should be coordinated with the audiovisual system, for example, where presentation projectors may be supplied in a room, consider splitting switching so that the front area of the projector is on a separate circuit from the rest of the room. In rooms that could possibly be used for video conferencing, consider utilizing wall washers. Careful attention should be paid to the balance of natural and artificial light, colour temperature, interaction with various displays, heat generation, noise generated by dimmers and ballasts, operational costs, etc. Where required, LED should be used for emergency lights.

Lighting Raceways & Wiring:

All wiring running in excess of 10 ft [3m] should be installed in a metal raceway, and runs longer than 10 ft [3m] should be EMT or galvanised rigid conduit, in shorter runs BX type cable may be used. Copper wire should be used in luminaire drops only.

Lighting Performance Values:

Type of space	Illumination Value [LUX]
Office Work Space	
Washrooms – general area	*500 [at desk top level]*
Washrooms – stall area	*300 [at floor level]*
Signage and Visuals	*450 [at desk top level]*
Library/ Registry Desk/	*250 [at floor level]*
Library Book stack/ Registry Shelving	*450 at desk top level]*
Store / Equipment Rooms	*400 [at task level: 1m/3ft]*
Public Waiting Areas [seated]	*150 [at sea level]*
Public Gallery [court room]	*250 [at sea level]*
Judges / Magistrate's Bench	*450 [at desk top level]*
Council Bar	*500 at table top level]*
Holding Cells Receiving	*500 [at counter level]*
Holding Cell	*400 [at task level: 1m/3ft]*

Technology:

Technology systems used should be integrated within the electrical design, and should be standardized and consistent throughout all buildings so as to minimise potential points of failure and simplify training, general usage and technical support. Audio visual systems in particular should be designed to operate simply and efficiently, with little time committed to set-up or a requirement for technical persons to perform the set-up, and should not require much training or a steep learning curve. System solutions should be scalable in order to meet future needs. Audiovisual and information systems technologies is converging, therefore metacontrol and rich-media streaming and IP-enabled devices that require network connectivity and bandwidth [particularly videoconferencing codecs] are coordinated to accommodate the functional needs of the audiovisual systems. Infrastructure [cable pathways, power, network connectivity] should be designed to accommodate the full implementation of desired technologies, even if some system subsets are not put into operation at the time of building opening.

Lighting Requirements For Technology:

The challenges facing the lighting designer are magnified, as video cameras are not as forgiving as the human eye. The bright illumination levels required for video cameras to produce quality images works counter to the requirements for high quality projected images. Designing a lighting system that successfully satisfies the requirements of the camera and display requires careful planning. Lighting should provide the lumen levels and colour temperature necessary to produce clear images of both the participants and the documentation.

Power requirements:

Clean power should be provided, that is power with no further equipment loads, such as those with switched mode power supplies that generate electrical noise on the power line, including air conditioning equipment, motors that stop and start regularly, uninterruptable power supplies, heavy industrial equipment, or dimmed lighting loads, all of which create transients, harmonics, surges and spikes. Additionally, to ensure power quality, use of a dedicated "technical power" distribution panel fed by a dedicated technical power circuit should be considered. All equipment within a room should then be concentrated onto this circuit.

Fire alarms:

Fire alarm systems selected should be of the microprocessor controlled, intelligent reporting type, and should operate on the single stage principle. The system should incorporate a local fire alarm control panel [FACP], and all initiating devices should be individually addressable, and the addresses indicated on record drawings. The fire alarm system should receive power from the building emergency power supply, where available, and in addition should be supplied with an appropriately sized battery back-up. The system should be capable of incorporating digital voice messaging. The design should incorporate individual conduit system and risers, including fire fighter telephones, voice communication, visual signal appliances, initiating and monitoring devices, network data communication between devices including FACP, suppression [where used] system wiring. The system design should incorporate a means of monitoring the area or stair well pressurisation fans and provide positive feedback to the FACP to display fan status.

Security:

\Access control should be fully automated with real time status of every access-controlled door, with a manual override capability to deny access in certain areas as deemed necessary. Such access-controlled doors should also be visible by remote controlled PTZ camera offering full surveillance coverage of each controlled door, and connected to an audible alarm should such a door be opened without authorization. Alarms should be placed in strategic locations, and should be visible by remote controlled PTZ camera, and connected to an audible alarm