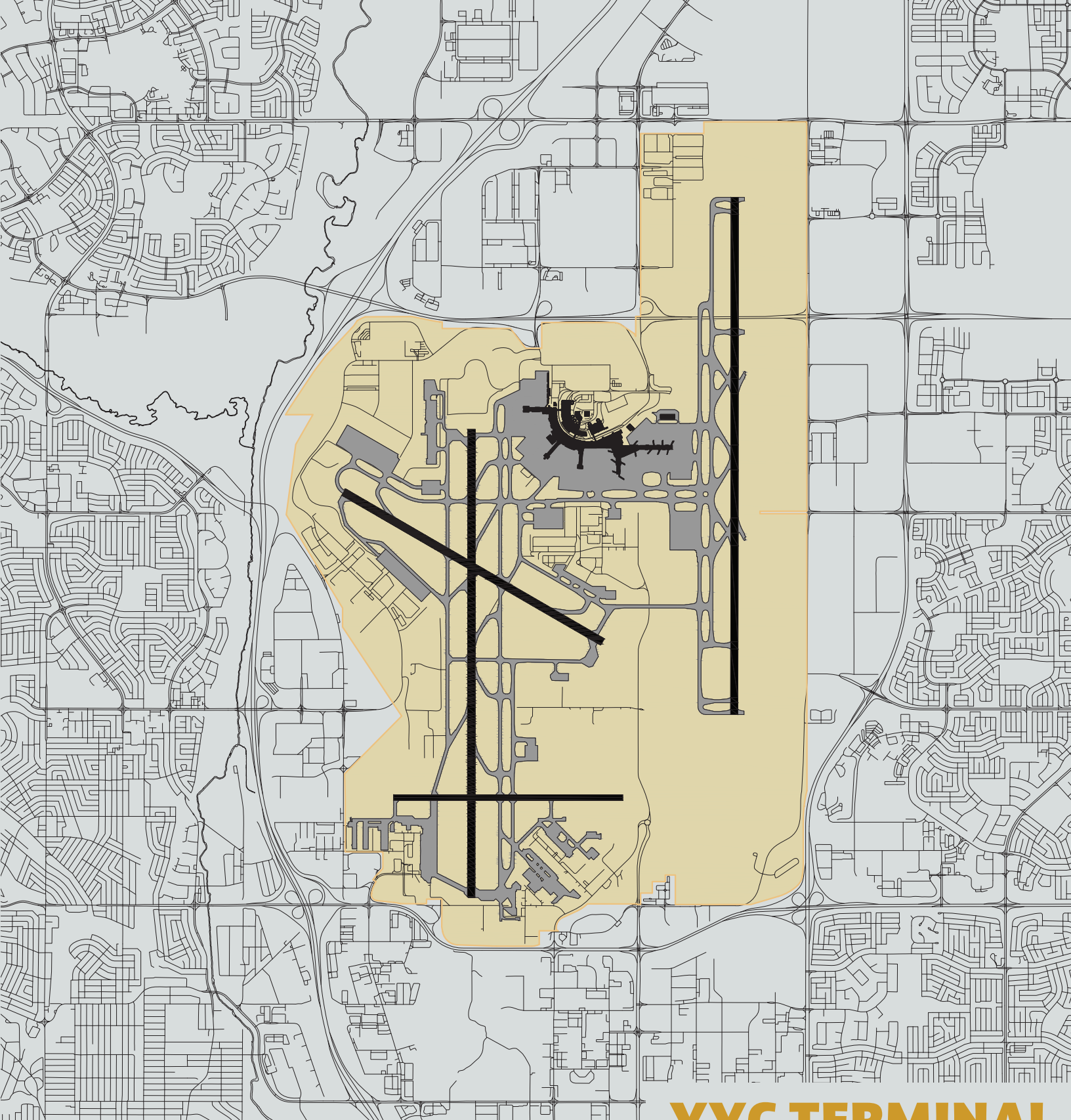

YYC TERMINAL

TECHNICAL DESIGN AND CONSTRUCTION STANDARDS

MAY 2023

YYC™ CALGARY AIRPORT AUTHORITY

REVISION CONTROL RECORD

Date	Revision/Reason	Section	Revision Stakeholder	Completed by
VERSION 1 January 2019	Combined YYC ITB Technical Standards Document with YYC Tenant Design Guidelines and Standards	All		Shannon Olmstead Garnette Arsenault Stefan Kutac
VERSION 2 January 2020	Revisions to Architectural Section 2.0 to incorporate YYC Security changes	Section 2.0	YYC Security Dean Corradetti Justin Sangster	Garnette Arsenault
VERSION 3 March 2021	Revisions to Construction Rules Section 6.8 to include reusable hoarding	Section 6.0	Development Services	Garnette Arsenault
VERSION 4 April 2023	Revision to Electrical Identification of Insulated Conductors Add Appendix H Alberta STANDATA bulletin 21-ECB-004(REV 1)	Section 4.0	YYC Electrical Cory Sehn	Garnette Arsenault
VERSION 5 May 2023	Revisions to all sections to introduce Proponent Section 2.0 Architectural 2.3.2 (o) floor loads Appendix I – Security Deposit Policy	All Section 2.0	RJC Structural Engineer for Terminal Building Development Services	Garnette Arsenault Dilraj Gill

F - YYC Building Communication Systems and Cabling Policy, Procedures & Standards

G - Parkade Rental Kiosks & Lot Identification Details

H - Alberta STANDATA bulletin 21-ECB-004(REV1)

I - Development Security Deposit Policy

Definitions

1. Air Terminal Building Complex represents the terminal building, parkade and rental car centre.

2. “ATB” means the Air Terminal Building Complex.

3. “APEGA” is the Association of Professional Engineers and Geoscientists of Alberta that regulates the practices of engineering and geoscience in Alberta on behalf of the Government of Alberta through the Engineering and Geoscience Professions Act.

4. “Authenticated” means that an APEGA licensed professional has completed the work and is assuming technical responsibility for the professional work product.

5. “BOH” is back of house.

6. “Base Building Drawing” is a drawing provided by the Landlord that documents all base building planning information pertaining to the Leased Premises. The information is provided in the form of a scaled drawing(s) identifying in plan, the location of all base building services provided by the Landlord, existing structural elements (if any) within the Leased Premises, demising wall and lease line locations. From this information the Tenant’s consultants develop their design and construction documents.

7. “Building Permit” means a permit issued pursuant to the City of Calgary Building Permit By-Law authorizing construction.

8. “Calgary Airport Authority” or “Airport Authority” means the Airport Authority established pursuant to the “Regional Airports Authorities Act” SA 1989, c, R-9, 0S.

9. “City of Calgary” or “City” means the Corporation of the City of Calgary or the land lying within the corporate limits of the City, as the context requires.

10. Construction Installation Permit “CIP” is a permit issued by the Calgary Airport Authority allowing the alteration of lands and/or buildings managed by the Landlord. The issuance of a CIP is the means by which the Landlord monitors changes and coordinates all affected parties. Each Tenant must obtain a Construction Installation Permit (CIP) from the Calgary Airport Authority prior to proceeding with any work.

11. “Demising Wall” is the common wall between two adjacent Leased Premises or between a Leased Premise and a common area. The demising wall extends back from a neutral pier or demising cap.

12. “Demising Cap” is the architectural element separating two adjacent Leased Premises or a Leased Premise and a service corridor.

13. “Design Control Zone” is an area established by the Landlord inside the Tenant’s Leased Premises within which the Landlord maintains the right to approval all the Tenant’s materials, finishes, fixture layout, signage, fittings, display and lighting elements.

14. “Development Coordinator” is the individual who represents the Calgary Airport Authority and is the liaison between the Proponent and the Calgary Airport Authority for

all review and approval phases from preliminary design to completion of construction. Reference to the Airport Development Coordinator will be either the Manager, Development Services or the Development Coordinator.

15. “Landlord” The Calgary Airport Authority is the Landlord of Calgary International Airport

16. “Lease Line” is the line shown on the Base Building Drawing defining the confines of the tenant’s demised premises.

17. “Leased Premises” is the area leased by the Landlord to the Tenant as defined in the Base Building Drawing and the Lease Agreement.

18. "Proponent” means the individual, partnership, corporation, trust, trustee or other entity, or any combination of the foregoing, who wishes to undertake a Project at the Calgary International Airport (YYC) pursuant to a right to occupy, use, lease, license and/or develop property, whether land or building, and whether as a tenant, licensee, developer, contractor, consultant or other user, and includes the Proponent’s representatives, agents, contractors, employees and consultants.

19. “Record drawings” are prepared by a licensed professional to record design changes for which they accept professional liability.

20. “Storefront” is the front face of the Leased Premises. In the case of a premise with more than one exposure to the Concourse or public walkway, the storefront refers to all facades.

1.0 - INTRODUCTION

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The YYC Terminal Technical Design Standards and Guidelines is a manual prepared by the Airport Authority that outlines the technical and design requirements to ensure a high level of workmanship, methods, materials, appearance and quality for any project undertaken in the Terminal building. These are the minimum acceptable standards, and apply to all developments, alterations, improvements, and additions to the building and/or within the building.

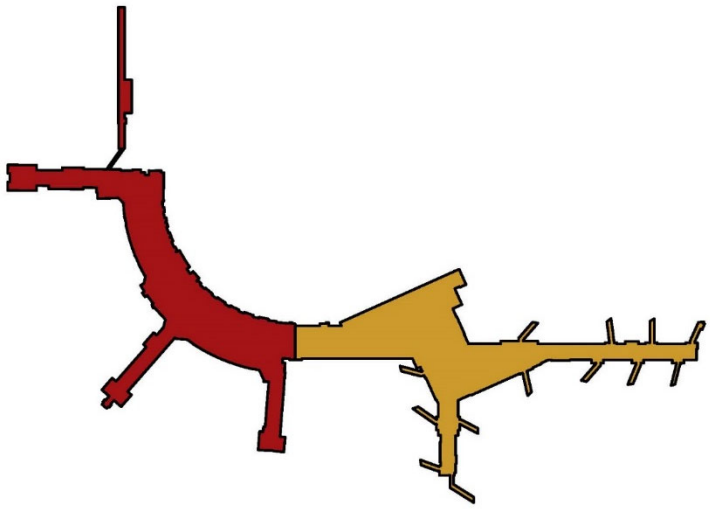
In addition to outlining the design standards and guidelines, this document outlines the submission and approval process that all Proponents must follow. All projects must comply with these standards, unless authorized by The Calgary Airport Authority.

The Calgary Airport Authority, as Landlord both in the Terminal Building Complex and surrounding lands, has a responsibility, as set out in the Transport Canada Lease, to provide Transport Canada with information regarding any development. As a Proponent of The Calgary Airport Authority, the responsibility to comply with these standards is inherent. As such, the Airport Authority developed the Construction & Installation Permit to be used as a tracking tool and instrument to monitor development and ensure that it meets the Airport Authority's standards.

The Calgary Airport Authority reserves the right to amend these standards at any time. The Calgary Airport Authority also reserves the right to waive or increase these standards as may be required due to the specific characteristics and location of any given project. Should the Airport Authority refuse an application for development, the applicant will be provided with written reasons for refusal.

These Technical Design Standards and Guidelines will apply to new and existing Proponents upon any improvements or where applicable, lease renewals.

Terminal Standards Key



	Domestic Terminal Building: Original Terminal, Expansions pre ITB
	International Terminal Building

1.1 Development Process

A Construction & Installation Permit (CIP) application form must be submitted to the Calgary Airport Authority with detailed drawings outlining the work that is to be performed. The online CIP application is available on the Calgary International Airport's webpage (www.yyc.com). The form must be completed in its entirety. Base drawings can be requested from a Development Coordinator of The Calgary Airport Authority.

Once the application has been submitted and checked for completeness, a preliminary review will begin. The project will be circulated to those parties within the Airport Authority that may be affected. A review of all disciplines affected by the work will be detailed, and comments will be forwarded to the Proponent, or their authorized representative. Submissions may require revisions if it is incomplete, or does not meet the standards as laid out in this document.

After revisions have been made to the satisfaction of the Airport Authority, a CIP may be issued to allow the Proponent to begin work. It is important to note that other permits may be required from other authorities having jurisdiction (ie. The City of Calgary). In these instances a letter of authorization from the Airport Authority is required before a Proponent may apply for any such permits.

1.2 Permits from Other Jurisdictions

Once the Airport Authority has given its approval to the Proponent in the form of a letter of authorization, the Proponent may apply for a Building Permit from the City of Calgary. The City of Calgary will not accept or process a Building Permit application without a letter of authorization from the Airport Authority.

Once the Proponent has obtained a Building Permit from the City of Calgary, the Airport Authority will issue the CIP to the Proponent. Every Proponent must obtain a CIP from the Calgary Airport Authority prior to proceeding with any work.

1.3 Compliance with Governing Authorities

The following codes, regulations & acts shall apply as they relate to the specific development. Although this list attempts to be complete, it is the Proponent's consultants and contractor's responsibility to ensure that all applicable codes and their most current regulations are adhered to, and that the appropriate permit(s) are displayed at the work site.

- Canadian Electrical Code and Alberta Appendices
- Canadian Environmental Protection Act
- Canadian Heating, Ventilating and Air Conditioning Code
- Canadian Labour Code - Part II

- Canadian Plumbing Code
- Canadian Occupational Safety and Health Regulations
- Alberta Building Code
- National Building Code
- National Fire Code
- Alberta Fire Code
- Alberta Environmental Protection and Enhancement Act
- Transportation of Dangerous Good Act (TDGA)
- CAN/CSA B651-M90, Barrier Free Design
- CAN/CSA C22.2 214, Communication Cables
- ANSI-J-STD-607-A-2002 (607-A) Commercial Building Grounding and Bonding Requirements for Telecommunications
- TIA/EIA 568-B Commercial Building Telecommunications Cabling Standards
- TIA/EIA 569-B Commercial Building Standard for Telecommunications Pathways and Spaces
- Alberta Occupational Health and Safety and its regulations
- Alberta Pressure Equipment Safety Regulation
- American Society of Mechanical Engineers Code, Boiler and Pressure Vessels
- Workplace Hazardous Materials Information System (WHMIS)
- The Calgary Airport Authority CADD Manual

In cases where more than one regulation applies to a specific situation, the most stringent requirement shall apply.

NOTE: the review of plans, specifications, and construction details, and the issuance of a Construction & Installation Permit by The Calgary Airport Authority, in no way relieves the Proponent/owner and /or their consultants and contractors from complying with all applicable by laws, codes, regulations, and the most stringent requirements of all authorities having jurisdiction.

1.4 Development Services

The Development Coordinator represents the Landlord (The Calgary Airport Authority) and is the liaison between the Proponent and the Landlord for all construction review and approval phases from preliminary design to completion of work.

All correspondence, questions and submissions related to construction should be forwarded to:

The Calgary Airport Authority
Calgary International Airport
2000 Airport Road N.E.
Calgary, Alberta T2E 6W5
ATTENTION: General Manager, Development Services

Email: CIP@yyc.com

1.5 Airport Authority Responsibilities

1.5.1 Base Building Drawings

The Airport Authority will provide the Proponent with base building drawings for the area being constructed. The Proponent's consultants must check and verify the accuracy of these drawings on site.

1.5.2 Submission Review

The Airport Authority will review the submission within a reasonable time frame. Airport Authority comments may be provided if changes are required to the design submission. If the Airport Authority rejects a project submission, a written reason will be provided.

1.5.3 Coordination

The Development Coordinator will assist the Proponent with applications, permits, security escort coordination and other requests in order to ensure the project runs smoothly.

1.6 Proponent Responsibilities

1.6.1 Permit to Practice

It is the responsibility of the Proponent to hire qualified consultants and contractors, licensed to practice in the Province of Alberta.

1.6.2 Security

If the project takes place in a secure area, the Proponent is responsible for following Canadian Aviation Security Regulations (CASR 2012).

The Proponent is also responsible for providing or arranging for security escorts for the duration of the project.

1.6.3 Start-up Meeting

Medium to large construction projects require a pre-construction coordination / start-up meeting prior to commencement of any work.

1.6.4 Shutdowns

If service shutdowns within the project area are required during the construction period for any reason, the Proponent or his authorized representative must make those arrangements. Shutdown forms are available on the Calgary International Airport's webpage (www.yyc.com) and must be submitted a minimum of 5 business days prior to requested time of shutdown.

1.6.5 Final Inspection

The Proponent must ensure that all consultants - architectural, electrical, mechanical and structural, (if applicable) who are responsible for the Proponent's construction documents, perform a final inspection and ensure that the project has been constructed as per the construction documents and that all equipment and systems are operating as specified and designed. A copy of the occupancy permit (if applicable), final inspection report, list of equipment and acceptance of the work by the consultants must be forwarded to the Development Coordinator before the Airport Authority will accept the project as being complete.

1.6.6 Record Drawings

It is a condition of the Construction & Installation Permit and the Proponent's Lease Agreement that record drawings be submitted within 45 days of completion of the project.

1.7 Drawing Standards

Reference Appendix B – YYC CADD Manual.

In general, all drawings are to be presented on a standard B1 size format. Information is to be metric and drawing text shall be a minimum of 2.5 millimeters in height and suitable for 1/2 size printing and scanning.

Facility base information is available in AutoCAD.dwg format and it is desirable to have submissions in the same format.

2.0 - ARCHITECTURAL STANDARDS

2.0 ARCHITECTURAL STANDARDS AND GUIDELINES

2.1 General

All new development shall be sensitive to the design of the Airport Terminal Building and will be required to maintain the building's architectural and aesthetic integrity.

Design consultants and contractors shall conduct a site inspection of the project area prior to the preparation of design drawings or concepts. A preliminary concept review may be required and reviewed by the Airport Authority.

Public areas have been developed with a general architectural and aesthetic intent and should be considered with all finishes and basic design. All proposed colours and materials shall be assessed against public area colours and materials in order to determine compatibility.

The Airport Authority has developed documentation to assist with the overall design requirements for the project. A Thematic Master Plan and Terminal Building Design Criteria documents are available from the Development Coordinator assigned to the project. The Development Coordinator will provide the proponent with the relevant information for the specific leased premises.

Prior to construction, design consultants and contractors shall contact the Development Coordinator to confirm the location of lease lines and all critical dimensions. All development must occur within the designated leased areas.

Where applicable, all proposals shall ensure that airside views are maintained and maximized.

Any work undertaken in areas containing asbestos materials must comply with Alberta Occupational Health & Safety Standards.

Use of combustible construction material in construction assemblies is expressly prohibited without prior approval of the Airport Authority.

2.1.1 Design Control Zone (Concession Spaces)

The Landlord has established an area inside the Leased Premises for Concessions called the Design Control Zone. The Design Control Zone can be defined as the area between the front lease line and an identified *closure* line. The control zone can vary depending on the concession location. The Airport Authority can confirm this dimension during project start up.

Free-standing kiosks are entirely within the Design Control Zone.

Within this area the Landlord retains approval of all aspects of the Proponents' storefront design including furnishings, fixtures, signage, lighting and merchandise presentation.

2.1.2 Base Building Structural Elements

Base building structural elements (including columns) falling within the Design Control Zone cannot be modified or concealed.

Structural elements within the leased space beyond the Design Control Zone cannot be modified but may be clad or covered (cladding cannot be affixed to the structural element), subject to approval. The use of fasteners, adhesives or signage is expressly prohibited without prior approval of the Airport Authority.

The structural precast concrete elements of the **Domestic Terminal** building form much of the building's architectural detail. Proponents are encouraged to take advantage of the structural columns within their leased area by choosing finishing materials that complement the style and texture of precast concrete. In order to maintain the architectural integrity of these major structural elements, the following restrictions apply:

(a) ***The framing in, concealment or painting of precast concrete components is strictly prohibited****.*

(b) The use of fasteners, adhesives or signage on columns is expressly prohibited without prior approval of the Airport Authority.

2.1.3 Storefronts

Storefronts should offer the maximum exposure of the Proponent's premises. Two thirds (66%) of the storefront must be either fixed glass (tempered or safety), open access or a combination thereof.

2.1.4 Bulkheads

Bulkheads within the Proponent's Leased Premises should be finished to a high level durable good quality material such as tile, wood, or metal.

Bulkheads must be supported and secured from within the Proponent's premises.

Bulkheads may not extend lower than 2400 mm (8'-0") above the finished floor and should align with the height of adjacent bulkheads where possible.

2.1.5 Entrances and Closure Systems

Closure systems should be but are not limited to, the following types:

- Frameless glass doors on bottom and top patch pivots with a 100mm high stainless steel bottom rail or other approved finish.
- Single track frameless glass siding doors. Note: Multiple track or stacking metal frame panels are not permitted and sliding doors when open should be concealed from public view.

- Folding aluminum grilles and closures with top hung track. Note: Grilles and closures should be finished in clear anodized aluminum, complete with emergency exit doors and tempered glass or perforated panels. Grilles should be stored in a pocket enclosure during business hours.

- Rolling overhead aluminum grille with recessed side-rails. Finish to be clear anodized.

- Under some conditions wood storefronts, closures, trim and fittings will be permitted. Such details must conform to flame spread ratings required by applicable codes and authorities having jurisdiction.

- See also Section 2.3.5 Doors & Frames

2.2 Concessions

For specific concession-related (retail, food & beverage) architectural design standards and guidelines, the YYC International Terminal Concession Design Guidelines and Domestic Terminal Building Design Criteria Manual should be consulted, pending project location within the terminal.

2.3 Non-Concession Spaces (Offices, Operational Spaces, Airline Lounges)

2.3.1 Exterior Base

(a) When constructing a wall exposed to a public area, an approved exterior base is required. Approved exterior bases include pre-security 380 mm (15”) and post-security 330 mm (13”) stainless steel 1.6mm gauge mounted to plywood substrate as typical Terminal quality. Proponents should consult with the Development Coordinator to determine the appropriate base requirement.

2.3.2 Floors

(a) The Airport Authority will approve all floor materials on a project-by-project basis. However, in order to assist Proponents, design consultants, and contractors, the following tables have been prepared as a guide.

Preferred Flooring Materials:

Material	Remarks
Stone tile	Includes marble, granite, slate etc.
Ceramic or porcelain tile	
Resilient flooring materials	Includes vinyl composite tile, linoleum, sheet vinyl.

	These materials shall be commercial grade.
Concrete with polymer coating	Ramp and utilities level space only

Discretionary Use (requires specific approval by the Airport Authority) Flooring Materials:

Material	Remarks
Rubber flooring	May be permitted in certain circumstances
Hardwood	May be permitted in certain circumstances Not recommended in high traffic areas
Carpet	
Carpet tile	The use of carpet tile is preferred over the use of roll carpet
Laminate and engineered	These materials shall be commercial grade.

(b) Use of solvent free adhesives and low (VOC) volatile organic compound type solvents is required.

(c) Flooring materials not listed in the above tables may be allowed at the discretion of the Airport Authority.

(d) New flooring may not be installed on top of old or existing flooring unless authorized by the Development Coordinator.

(e) Samples of flooring material shall be submitted to the Development Coordinator for approval.

(f) Carpet must be fire resistant, as per the standards contained in the National Fire Code.

(g) The use of flooring material containing asbestos is prohibited. Removal of existing asbestos tile must be done in accordance with Alberta Occupational Health & Safety Standards.

(h) The transition between Proponent installed and base building flooring shall occur at a point deemed appropriate by the Airport Authority.

(i) Where two flooring materials abut, the Proponents shall ensure that the finished floor elevations match, and that trip hazards are not created. If necessary, a threshold shall be used.

(j) When cutting existing quarry tile, the Proponents shall take necessary precautions to ensure that the cuts are clean and shall be responsible for the replacement of damaged tiles.

(k) All grouts shall be adequately sealed to prevent discoloration due to accumulation of dirt and grime.

(l) All penetrations through the concrete floor system assembly shall conform to Part 3 of the Alberta Building Code and will be required to be sealed by a fire stop system as well as waterproofed.

(m) When coring through the floor, spotters must be used below. All measures must be taken to reduce noise and control dust. When coring is required, the Proponent is responsible for obtaining a YYC Coring Permit and must adhere to the Coring Permit Request Procedures, prior to work beginning. Forms are available on the Calgary International Airport's webpage (www.yyc.com).

(n) The Landlord has designed the floor slab for all new and existing areas of the **Domestic Terminal** and within the Leased Premises to receive a maximum superimposed dead load of 1.0 kPa (100 PSF) and a maximum live load of 4.8 kPa (100 PSF). Significant point loads and atypical loads are subject to review by the Airport Authority's structural engineer, including suspended loads from the roof structure.

(o) The Landlord has designed the floor slab for all areas of the **International Terminal** and within the Leased Premises to receive a maximum superimposed dead load of 1.0 kPa (100 PSF) and a maximum live load of 4.8 kPa (100 PSF). Significant point loads and atypical loads are subject to review by the Airport Authority's structural engineer, including suspended loads from the roof structure.

All heavy equipment and construction loads are subject to review by the Airport Authority's structural engineer at the Proponent's cost.

(p) Base building expansion joints within the Leased Premises must be maintained. Any treatment to the expansion joint must be approved by the Development Coordinator prior to installation.

2.3.3 Membranes

Waterproof membranes shall be installed underneath floor finishes in all areas where there is supplied water and there is a potential for leaks (such as food and beverage prep and service areas, washroom areas, etc.).

(a) Waterproofing Crack Suppression Membranes:

Load bearing, reinforced, liquid applied membrane meeting the requirements of ANSI A118.10:

Acceptable materials:

(i) Custom Building Products Level Quik Waterproof and Anti-Fracture Membrane

(ii) Flextile Ltd. Flex WP-980 Waterproof and Crack Isolation Membrane

(iii) Laticrete International Inc. 9235 Waterproofing and Anti-Fracture Membrane

(iv) MAPEI Inc. PRP 315 Waterproof and Crack Isolation Membrane.

Note: The membranes identified above are specific to waterproofing of the exterior walls of crack isolation and suppression. Coordinate with manufacturers where a membrane is required for continual submersion or high moisture drive situations such as in saunas, swimming pools and fountains.

(b) Performed Waterproofing Membrane System:

ANSI A118.10, soft polyethylene membrane with fleece webbing laminated on both sides complete with special cut width rolls and special shapes for corners and pipe sleeves (and manufacturers' standard floor drain assembly).

Acceptable materials:

(i) Schluter Kerdi (and Kerdi Draine) - Telephone (403) 243-0434, (780) 483-8002 or (800) 667-8746.

Note: A performed waterproofing membrane is specifically intended for thin set tile application in shower and other wet areas.

(c) Uncoupling Membrane:

Rigid polyethylene membrane with a grid structure of square cavities 3 mm high each cut back in a dovetail configuration having anchoring fleece laminated to underside (or non-directional, non-deteriorating woven mat (10mm) (16mm) thick) complete with manufacturers recommended floor adhesives and setting materials:

Acceptable materials:

(i) Schluter Ditra - Telephone (403) 243-0434, (780) 483-8002 or (800) 667-8746.

(ii) Laticrete International Inc. (/QSM4) (QSM7) Mat - Telephone (403) 253-5150, (790) 451-2275 or (800) 838-4237.

Note: An uncoupling membrane is specifically intended for use in TTMAC 09300 Manual Details 313F and 325F for floors where directly bonding tile or marble to an unstable substrate could lead to failure of the installation. Other types of membranes can be used for this purpose, but these membranes form a part of the total tile setting system and are less susceptible to workmanship irregularities.

2.3.4 Walls

(a) The Airport Authority will approve all wall materials and finishes on a project by project basis. Proponents are urged to consider durability and maintenance when selecting materials for use in high traffic areas. However, in order to assist Proponents, design consultants, and contractors, the following tables have been prepared as a guide.

Preferred Wall Materials:

Material	Remarks
Stone	Natural only
Tile	Ceramic, porcelain or glass
Decorative metals	Includes stainless steel and pre-finished aluminum
Vinyl or textile wall covering	Encouraged in high traffic/high impact areas, minimum Type II grade
Solid surface	E.g. Corian
Slat wall	

Discretionary Wall Materials (requires specific approval by the Airport Authority):

Material	Remarks
Stone	Manufactured
Fiberglass reinforced panels	

Painted drywall or medium density fiberboard	In high traffic/high impact areas this finish is only permitted above 2400mm (8 ft).
Carpet/carpet tile	As base trim only
Faux finish techniques and materials	
Plexiglas, polycarbonate or plastic acrylic	

Prohibited Wall Materials:

Material	Remarks
Fabric/canvas	
Pegboard	
Cork or cork tiles	

(b) For the Domestic Terminal building only – Pre-cast Concrete Columns and Beams

No finishes are to be applied or affixed to the pre-cast concrete columns and beams in the **Domestic Terminal** building. See 2.1.2.

(c) Demising Walls

The Airport Authority has provided metal stud and drywall demising walls, taped and sanded between each leased space. Demising walls extend to the underside of the base building structure. All fire ratings and characteristics of the demising walls provided by the Airport Authority are indicated on the Base Building Drawing. The Proponent shall provide all wall treatments within the Leased Premises at the Proponent's expense.

No wall fixtures directly mounted on the demising walls will be permitted other than those approved by the Landlord. The Proponent acknowledges that the demising walls are not designed to support wall-mounted fixtures.

The Airport Authority will approve all wall materials and finishes on a project by project basis. Proponents are urged to consider durability and maintenance when selecting materials for use in high traffic areas. However, in order to assist Proponents, design consultants, and contractors, the following tables have been prepared as a guide.

Demising Walls (Design Control Zone) Preferred Wall Materials:

Material	Remarks
Stone	Natural only

Tile	Ceramic, porcelain or glass
Decorative metals	Includes stainless steel and pre-finished aluminum

Demising Walls (Design Control Zone) Discretionary Wall Materials (requires specific approval by the Airport Authority):

Material	Remarks
Stone	Manufactured
Vinyl or textile wall covering	
Plastic laminate	
Slat wall	Permitted when required as part of store/product display systems
Wood	Treatment to be approved by YYC

Demising Walls (Design Control Zone) Prohibited Wall Materials:

Material	Remarks
Unfinished	Painted only
Fabric/canvas	
Carpet/carpet tile	
Pegboard	
Cork or cork tiles	
Faux finish techniques and materials	
Plexiglas, polycarbonate or plastic acrylic	

(d) Where walls are to be attached to tile floors, attachment must be done at grout lines, where possible.

(e) All drywall is to be a minimum thickness of 16mm, fire rated to the most stringent rating of the National Fire Code.

(f) Where painted drywall is to be used, a paint sample shall be provided to the Development Coordinator for approval. One coat of primer and two coats of colour are required. The use of colours which match or are compatible with those in the surrounding area of the terminal is encouraged.

(g) ***All studs are to be metal. Wooden studs are strictly prohibited***. Wooden blocking shall only be considered when specifically identified on the submitted construction drawings.

(h) All baseboards are to match the colour, type and height of existing adjacent baseboard material.

(i) For all walls which are located adjacent to a public circulation corridor, or in any other area where baggage carts are commonly used, a durable base material shall be installed to a height of 380mm (15") above the level of the floor. Acceptable store front base materials include:

- stainless steel
- prefinished metals
- stone, quarry or ceramic tile

2.3.5 Doors and Frames

(a) All doors leading from public areas to secure areas, restricted areas, and/or to the outside, shall be insulated hollow metal doors in pressed steel frames, 44mm (1 ¾ ") thick - suitable for exterior use. Minimum dimension 915mm x 2135 (3' x 7').

(b) Doors requiring access control must be prepared using the following setup: "L9092EUL 03L 630 RX DPS".

(c) All wooden doors shall be solid core doors 44mm (1 ¾") thick - with heat/pressure applied plastic laminate to match existing Air Terminal Building Standards. Minimum dimension 915mm x 2135 (3' x 7').

(d) Doors may be equipped with a vision panel provided that any fire rating requirements are achieved.

(e) All metal doors and frames shall be painted to match the design of the adjacent areas.

(f) Glass doors must be safety glass tempered and have a contrasting mark as required by the local authority having jurisdiction.

(g) All doors shall have 3 hinges per door, of ball bearing type, with non-wrought stainless steel, 630 finish, unless provision is to be made to include an electrical access switch.

(h) Door stops shall be used where appropriate; finish 630 (stainless steel, satin finish).

(i) Spaces with doorways opening into post-security areas must be equipped with door closure devices.

(j) All door closures shall be L.C.N. Series Smoothee 4010 or 4110 finish 689 clear or 695 dark bronze.

(k) All door frames to be welded, mitred corners, 1.6mm (16ga) minimum heavy duty galvanized steel, primed and painted to match the design of adjacent areas.

(l) All doors in high traffic areas should be equipped with kick plates; finish 630. Kick plates will be a minimum height of 380 mm (15”).

2.3.6 Locks and Access Control

Installation of locks, security grill and access control will be reviewed on a project by project basis. YYC Development Services, Commercial & Retail, Infrastructure and Security will discuss requirements with applicants. All installations must be reviewed and approved prior to construction.

(a) All lock and access control installations must comply with all applicable security legislation and regulations in effect at the Airport.

- Application for Keys and Access
- Locksmith Service Request Form

All doors require Locksmith Service Request application *(lease entrance doors, back of house doors, airline office and agency doors, utility level storage room doors and store front grills)*

(b) All doors leading from public areas require access control.

(c) Installation of access control must be made via Construction and Installation Permit application and processed through YYC Development Services.

(d) Installation of non YYC approved locksets and/or access control is strictly prohibited.

(e) All access control including proximity readers and keyed locks require commissioning from the YYC contracted security integrator at the Proponent’s expense.

(f) Documents and information related to the above as well as other security related requirements are available from http://www.yyc.com/en-us/businessatyyc/passoffice.aspx

2.3.7 Internal Windows, Glazing and Coverings

(a) All interior glazing shall conform to Code.

(b) All interior glazing shall be tempered or safety glass, minimum thickness 10 mm (3/8”), 13mm (1/2”) recommended.

(c) All window frames in fire separations shall be of steel painted to match existing.

(d) Fixed glass walls must include a fixed stainless steel base. Pre-security 380 mm (15”) and post-security 330 mm (13”).

(e) Existing windows and window frames shall not be removed, altered, or obscured without the prior approval of the Airport Authority.

(f) Any attachments to window frames must be approved by the Airport Authority.

(g) Contractors shall take the necessary precautions to ensure that existing metal window frames are not damaged during construction.

(h) All interior window frames shall be prefinished clear anodized aluminum to match existing.

(i) Airside views from public areas shall be maintained whenever possible.

(j) All window coverings shall match those existing in the area, unless otherwise approved by the Airport Authority.

(k) All window coverings shall be flame resistant, and comply with the most stringent National Fire Code rating.

(l) Modifications or attachment to external windows or glazing is **strictly prohibited.**

2.3.8 Ceilings

Ceilings within the Leased Premises should be constructed in drywall or suspended metal or acoustical tile. Acoustic ceiling tile shall provide a decorative component, standard 24” x 48” (builder grade) acoustical tile ceiling systems are not permitted within the public areas of the Leased Premises. Exposed ceiling systems may be considered at the Airport Authority’s discretion.

(a) In some cases the Airport Authority may be required to specify the ceiling material or finish to be used. Proponents should verify any special ceiling requirements with the Development Coordinator.

(b) All drywall ceiling assemblies shall be a minimum 16mm fire rated gypsum board.

(c) All closed in ceiling assemblies shall provide a minimum one hour fire resistance rating.

(d) All suspended ceiling material should be either acoustic ceiling panels or metal ceiling components. Only approved acoustical tiles shall be permitted.

(e) Suspended ceiling systems must conform to all regulatory by-laws and Codes having jurisdiction.

(f) Proponents shall ensure appropriate access to mechanical or electrical equipment or fittings is provided for in all ceiling installations.

(g) Any access panel blocked by the Proponent's ceiling installation shall be relocated to a suitable location at the Proponent's expense.

(h) **Wood products for ceiling joists and suspended ceiling systems are strictly prohibited**.

2.3.9 Roof

(a) Roof installations, repairs, modifications (including penetrations through the roof) are strictly controlled, and shall be undertaken by the Landlord's contractor, at the Proponent's expense.

(b) Access to roof areas is allowed only under the supervision of an Airport Authority employee. To arrange access contact Development Coordinator.

(c) Fall protection systems may not be altered or affected by construction.

2.3.10 Concession/Store Tops

(a) Where the top of a concession is exposed to views from above, the Airport Authority requires that the top of the concession/store be finished. Designs and materials which are consistent with the architectural detail of both the concession/store and the Airport Terminal Building, and which require minimum maintenance should be used.

(b) No conduit, wiring, plumbing or mechanical apparatus shall be visible from above or below.

(c) No storage is permitted on concession/store tops.

(d) Concession/store tops should be designed so as to allow minimal accumulations of dust and debris.

(e) All concession/store tops shall be maintained and cleaned on a regular basis.

2.3.11 Interior Lighting

(a) The Airport Authority will approve all lighting materials and fixtures on a project by project basis.

(b) It is the preference of the Airport Authority for use of energy efficient light fixtures e.g.// LED's. Energy Star lighting products are encouraged.

(c) Only commercial-quality fixtures shall be installed.

(d) Painting of switch plate covers is prohibited.

(e) Proponents are to comply with all requirements in 4.0 – ELECTRICAL STANDARDS AND GUIDELINES.

2.4 Signage

Commercial and retail signage requirements are defined in each of the design criteria manuals for both the Domestic and International/Transborder areas.

The Airport Authority will approve all sign design, materials and finishes on a project by project basis.

All signage associated with a proposed development must be submitted as a comprehensive package and shall be included as part of the initial development submission.

2.4.1 Offices

Please reference Appendix A – Office Signage for office signage standards, details and placement.

Note: placement of signage of any type on main entrance doors is **strictly prohibited.**

2.4.2 Storage Spaces

A base building-provided identification sign mounting structure has been provided for all utilities-level storage spaces.

2.4.3 Other Leased Spaces

Approval of signage for spaces other than identified above will be reviewed on a case by case basis and will be dependent upon whether the proposed identification sign adheres to a number of basic considerations including type, height, size and location.

Prior to installation, the size, location(s) and installation details including: hangers, fastenings and bracing, anchors, conduit, mounting grounds and electrical connections must be approved by the Landlord.

2.5 Official Languages Policy

The Calgary Airport Authority Official Languages Policy is based upon the provisions of Bill C (Airport Transfer (Miscellaneous Matters) Act), the Official Languages Act (Parts IV, V, VI, VIII, IX and X), and the Official Languages (Communication with and Services to the Public) Regulations. Proponents are to comply with the Official Languages Policy and any future policy regulations and/or amendments.

With respect to signage, the following regulations apply:

All signage (electronic or static) except registered names or logos, displayed in public areas must be provided in both official languages.

Those organizations that are specifically identified in the Official Languages Regulations as providing specified services to the travelling public through a contractual agreement with the Calgary Airport Authority must provide them, or make available, in both official languages. This applies to the following services:

- restaurants, fast food outlets, car rental agencies, travel insurance, ground transportation dispatch, foreign exchange, duty free shops and hotel services;
- self-service equipment, including automated banking machines and vending machines, and the provision of instructions for the use of public telephones and electronic games: and
- passenger screening and boarding services, public announcements and the provision of other information to the public, and carrier services, including counter services for ticketing and check-in.

Where a service is provided by means of printed or pre-recorded material, such as signs, notices and menus, car rental contracts and travel insurance policies for the travelling public, the material shall be provided, or made available, in both official languages.

Where a service is provided by means other than those referred to above, the service shall be offered to the travelling public by such means as will enable any member of that public to obtain those services in the official language of his or her choice, within a reasonable period of time.

2.6 Barrier Free Design Requirements

Proponents are required to comply with the Alberta Building Code and National Building Code requirements for barrier-free design.

The Alberta Building Code and National Building Code have set standards for barrier free design with which the Proponent's designers must comply especially

within all public-accessible locations. Particular attention must be paid to entranceways, paths of travel, floor level changes, washrooms accessible to the public, doorways and doors, aisle widths, counter heights and widths, eye level displays and signage, and public seating.

2.7 Vending/ATM Machines

Vending or ATM machines, when approved by the Airport Authority, shall be located so as not to impede the flow of traffic. The size and location of all machines must be approved by the Airport Authority prior to installation.

Vending or amusement machines may not exceed a noise level of 85 db at any given time.

Unless otherwise approved by the Airport Authority, all machine enclosures should have a 380mm (15”) high stainless steel base to protect the machines from baggage cart damage.

2.8 Displays

Permanent or temporary displays must be approved by the Airport Authority prior to installation.

2.9 Railings

Railings within the Proponent’s space should be finished in durable materials such as powder coated metal, stainless steel, brass, natural wood or tempered glass. Railings must be installed within the leased premises. The Airport Authority will approve all railing material and finishes on a project by project basis.

The installation of railings without prior approval from the Airport Authority is strictly prohibited.

3.0 - MECHANICAL STANDARDS

3.0 MECHANICAL STANDARDS AND GUIDELINES

3.1 General

3.1.1 Existing Conditions

(a) In specific locations the Airport Authority ("Landlord") has established certain fixed Base Building mechanical services that pass through the Leased Premises. Any connection, changes or modifications to existing base building services, including structural items, within the Leased Premises shall be reviewed with the Airport Authority and the Landlord's written approval must be obtained before any work is done.

(b) Except for redundant in-store ductwork associated with heating and cooling on existing premises scheduled for renovation, the Proponent shall not remove, alter or relocate any other ductwork without the prior consent of the Airport Authority.

(c) Any changes or modifications to existing base building services, including structural items, within the Leased Premises shall be reviewed and approved by the Airport Authority before any work is done.

(d) Waterproof membranes are required underneath floor finishes in all areas where there is supplied water and there is a potential for leaks (such as food and beverage prep, service areas and washroom areas etc.) Where a waterproof membrane exists, Airport Authority approved methods for repairs shall be used to maintain a watertight seal after construction/renovation. Please reference Section 2.3.3.

(e) The Airport Authority must approve any work which may affect the base building warranties, before any work can commence.

(f) Where construction involves the modification of an existing control system, the Proponent shall coordinate the installation of all control components required to provide a fully operational system including the replacement of existing defective components, with the Airport Authority. All controls and components must be YYC BACnet compatible.

(g) The Airport Authority has supplied connections to the base building systems at designated points within the Lease Premises as identified on the Base Building Drawing.

(h) It is the responsibility of the Proponent to check and verify actual on-site dimensions and conditions.

(i) All wall and/or floor penetrations through a fire barrier within the Leased Premises must be fire stopped as required, using only firestop products that have been ULC or cUL approved.

(j) All existing floor penetrations within the Leased Premises must be fire stopped and sealed with an Airport Authority approved waterproof membrane.

(k) All existing plumbing cleanouts within the Leased Premises must be relocated to floor level at the Proponent's expense.

3.1.2 Demolition of Existing Mechanical Systems

(a) Any plumbing and / or mechanical equipment which is no longer required by the Proponent or is to be abandoned must be removed. Removal shall extend to the last valve, tee ("T") or wye ("Y") connection.

(b) Pneumatic tubing no longer required by the Proponent or to be abandoned must be stripped back to the main and capped.

(c) The Proponent is responsible for the repair or patching of all floors, walls, etc. damaged as the result of the removal of any equipment. New materials should be used to match the existing condition.

(d) Pipes and systems that are no longer required that are removed are to be noted as being removed on a set of record drawings. Such drawings shall be submitted to the Airport Authority.

3.1.3 Access to Equipment & Fittings

(a) Access to base building equipment and fittings located in Proponent ceiling spaces (or any other location as deemed required by the Airport Authority for operations & maintenance purposes) must be maintained. Access hatches must be of an appropriate size and location and free of obstacles and obstructions. Please reference Section 2.3.7.

3.1.4 Cutting & Patching

(a) All coring requires a YYC Coring Permit and must adhere to the Coring Permit Request Procedures. Forms are available on the Calgary International Airport's webpage (www.yyc.com).

(b) Mechanical coring must be undertaken for slab penetrations greater than 25 mm (1") in diameter.

(c) Provide sleeves for all wall and floor penetrations.

(d) All wall and floor penetrations must be sealed to the Airport Authority's satisfaction. All penetrations must be fire-stopped as required and all floor penetrations must have a watertight seal.

3.1.5 Shop Drawings

(a) One (1) set of approved shop drawings must be submitted to the Airport Authority for all specified Proponent equipment as per the approved drawing submission.

3.1.6 Standard of Materials and Workmanship

(a) The Proponent's contractor must employ tradesmen properly licensed and qualified to perform the specified work.

3.1.7 Owner's Stock

(a) Existing equipment not intended to be re-used shall be disposed of by the Proponent.

3.1.8 Record Drawings

(a) Refer to Section 7.0, PROJECT COMPLETION.

3.1.9 Coordination of Services

(a) The Proponent must verify the locations of all existing services with the Airport Authority prior to the commencement of any work on site. Only Airport Authority staff or Airport Authority appointed contractors shall perform base building shutdowns or isolations.

(b) The Proponent is required to complete a Building Services Shutdown Request Form to arrange for equipment to be isolated prior to work commencing.

Shutdown forms are available on the Calgary International Airport's webpage (www.yyc.com) and must be submitted 5 business days prior to requested time of shutdown.

The following require completion of a Building Services Shutdown Form:

- To isolate, drain & refill the heating and fire protection systems.
- To isolate domestic water supplies
- HVAC systems
- Gas service

- X-ray

3.1.10 Performance Tests

(a) The Proponent is required to undertake performance tests for all mechanical and electrical equipment and systems installed within the Leased Premises to ensure proper operation and that all requirements have been met. Written documentation of the performance tests must be submitted prior to the Airport Authority's acceptance of the work.

3.1.11 Air and Water Balancing

(a) The Proponent will provide air and water balancing of HVAC and exhaust systems installed. A copy of the approved report must be added to the Maintenance Manual.

3.1.12 Painting and Identification

(a) All piping shall be identified by black painted labels and directional flow arrows. Identification shall be provided at fifty (50) foot (15000mm) intervals, on both sides of a wall/floor penetration and behind access doors. All identification and labeling shall comply with Appendix C – Colouring / Label Specifications.

3.1.13 Fire Separations and Fire Dampers

(a) The Proponent must provide and maintain all fire and smoke separations and fire dampers within the Leased Premises and between adjacent tenancies and the base building as required by the Alberta Building Code and the Alberta Fire Code.

(b) The Proponent must provide and maintain watertight seals around all pipes and duct penetrations through designated smoke or fire separations.

3.2 Ductwork and Accessories

3.2.1 General

(a) The Proponent must provide adequately sized access panels for dampers, equipment, fire dampers, valves, radiation valves, and any other equipment requiring servicing.

(b) The Proponent must verify with the Airport Authority the location, size, and quantity of access panels required prior to construction.

3.2.2 Heating, Ventilating and Air Conditioning

(a) For the International Terminal only - Zone valves for chilled and heating water shall only be opened by the Airport Authority's

contractor and maintenance staff. The valves will only be opened once chemical treatment has been completed and reports issued and submitted to the Landlord for approval.

(b) Chemical treatment shall only be completed by the Landlord's contractor, upon request from the Tenant to the Landlord's maintenance department, and all costs back charged to the Tenant.

(c) Air distribution within the Leased Premises shall be installed by the Tenant and should include ductwork, dampers, diffusers, grilles, and 25mm (1") thermal insulation with a vapor barrier.

(d) Any air tempering and/or zone control with an electrical heat source proposed by the Proponent is subject to the Airport Authority's approval and will be at the Proponent's expense.

(e) Where applicable, zone control within the Leased Premises shall be provided by modifying existing radiation heating systems.

(f) Aluminum or steel jackets shall be provided for all outdoor piping and ducting.

(g) All exposed piping and ducting canvas jackets shall be painted.

(h) The Proponent shall use rigid rectangular ductwork. Flex duct will only be allowed for low pressure duct drops to a maximum of 1000mm (3'-0") in length. All ductworks shall be installed as per Sheet Metal and Air Conditioning Contractors National Association (SMACNA) and American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).

(i) Duct tape shall not be used to seal any ductwork.

(j) Ventilation will be provided by the Airport Authority to satisfy the minimum requirements for the Proponents' use. Any additional exhaust or ventilation will be at the Proponent's expense.

(k) The use of water-cooled equipment is not permitted.

3.2.3 Exhaust / Make-Up Air

(a) The Proponent is required to exhaust all odours or substances, which, in the Airport Authority's opinion, are objectionable. Exhaust hoods shall be provided as per Code requirements or as determined by the Airport Authority's Engineer.

(b) Exhaust systems, including exhaust fans and hoods, shall be installed as per current NFPA Codes. Use of a sprinkler system

for hood extinguishing is not acceptable. Only CO2 or chemical extinguishing systems are permitted.

(c) Food and beverage Proponents must provide water washed exhaust hoods over cooking areas complete with an automatic fire protection system and grease interceptor.

(d) The Airport Authority's contractor will install a tie-in to the Fire Alarm System at the Proponent's expense. See item 4.9.

(e) It is the responsibility of the Proponents to supply and install their own make-up air system. The make-up air system is to be tempered and sized for 95% of the Proponent exhaust requirements. A common area unit will provide the remaining 5% of make-up air.

In some areas the base building ventilation system has been designed to accommodate kitchen exhaust and may include any make-up air requirements.

(f) For the International Terminal only - installation of kitchen exhaust equipment shall comply with Appendix D – Exhaust Hood Demand Control System Specifications.

(g) For the Domestic Terminal only – Kitchen exhaust terminations shall be installed and maintained so they do not leave grease and residue build up on any exterior infrastructure.

3.3 Gas

3.3.1 General

(a) Where applicable, the Airport Authority will extend a gas line from the Airport Authority's manifold to the Leased Premises. The Proponent must extend this line at their expense.

(b) All gas lines installed or modified by the Proponent must be inspected and signed off by the City of Calgary once completed.

(c) The Proponent shall be provided with a calibrated digital gas meter/interface module, capable of integration into the Airport Authority's Powerlogic Metering System. When room is available, Proponent gas meters are to be in the Airport Authority's Meter Room. The Airport Authority will supply conduit and wiring to the Leased Premises. The Airport Authority's contractor will tie-in the Proponent's gas metering system to the base building system at the Proponent's expense. If no room is available in the Airport Authority's Meter Room, the Proponent is to identify a location within their Leased Premises. The meter must be accessible and installed no higher than 5 feet (1500mm) above the finished floor.

3.4 Plumbing

3.4.1 General

(a) All Proponent equipment shall be installed on the Leased Premises by the Proponent.

(b) Vacuum breakers and backflow preventers must be installed by the Proponent on all plumbing lines as required by the Code and the Airport Authority.

(c) Adequately sized access panels for valves, cleanouts, and any other equipment requiring servicing must be provided by the Proponent.

(d) Access to domestic cold-water supply, sanitary pipes and venting will be provided by the Airport Authority either to the lease line or in some instances in as close proximity as possible. The Proponent must extend these lines at their expense.

(e) All copper piping should be type 'L' or 'K'. All vent lines shall be DWV copper or cast iron. XFR (fire-rated) PVC piping is acceptable.

(f) All drain lines and beverage runs (for food and beverage operations) shall be XFR (fire-rated) PVC piping (cast iron piping shall not be permitted).

(g) Exposed piping canvas jackets must be painted.

(h) Domestic hot water shall be electrically generated by the Proponent within the Leased Premises.

(i) Domestic cold water check meters for Proponent spaces will be provided by the Airport Authority and installed in a central location (International Terminal) and suitable location within the leased premises. The meter must be accessible and installed no higher than 5 feet (1500mm) above the finished floor. All meters must be connected to the Powerlogic Metering System.

(j) All spaces where food is cooked, processed, or prepared (including coffee and juice establishments) are required to install a surface-mounted grease interceptor in compliance with applicable City of Calgary Bylaws and/or as directed by the Airport Authority. All grease interceptors to be installed within leased premises.

(k) All cleanouts shall be installed above the floor level and shall be provided with adequately sized access panels.

(l) Water shut offs shall be installed within the Leased Premises.

(m) Food and beverage Proponents must install a double check valve assembly backflow preventer which is to be tested yearly and a copy of the report provided to the Airport Authority.

3.5 Fire Protection

3.5.1 Sprinkler System

(a) Where applicable, the Airport Authority has installed a sprinkler system grid within the open ceiling space of the Leased Premises.

(b) The Airport Authority's contractor will perform the interconnection of the sprinkler system to the base building fire alarm system at the Proponent's expense.

3.6 Controls

3.6.1 Control Components

(a) Control valves and dampers shall be equal to the base building standard type unless otherwise noted.

(b) Computer automated controls shall be of the same manufacturer as the base building standard.

(c) The Airport Authority recommends that all mechanical units be DDC operated and tied-into the Airport Authority's Building Management System. All tying-in shall be at the Proponent's expense. The Landlord will only monitor applicable equipment tied into the Landlord's system.

3.7 Thermostats

3.7.1 Where applicable the Airport Authority has installed one (1) thermostat in the Leased Premises at a designated location indicated on the base building drawing.

3.7.2 It is the Proponent's responsibility to determine the number and location(s) of thermostats required in their space. The Proponent at their expense shall undertake any additions or relocations required.

3.8 Operation and Maintenance Manuals

3.8.1 General

(a) The Proponent must provide manuals of all mechanical systems including operating maintenance and lubrication instructions to the Airport Authority upon completion of the work.

(b) The Proponent must provide the Airport Authority with certification of all equipment where required by local codes and authorities.

(c) The Proponent must provide the Airport Authority with copies of all shop drawings, maintenance bulletins and air balance reports.

(d) The Proponent must provide the Airport Authority with a list of addresses and twenty-four (24)-hour contact telephone numbers of all equipment suppliers and contractors.

(e) The Proponent must provide the Airport Authority with performance details for all equipment including curves for fans and pumps with actual operating points noted and the control sequence of operations.

(f) All of the above information is required by the Airport Authority to determine the impact on the air terminal building systems.

3.9 Equipment Maintenance

3.9.1 General

(a) The Proponent must provide the Airport Authority with a complete list of all equipment installed within the Leased Premises.

(b) The Proponent at their expense shall maintain all mechanical equipment installed by the Proponent over and above the Base Building services provided by the Airport Authority. Maintenance tasks and frequencies shall be adequate to ensure that all equipment is operating at the capacity to which it was designed. Proof of adequate maintenance shall be provided to the Airport Authority, if requested.

(c) If in the Airport Authority's opinion maintenance is inadequate the Airport Authority may have the maintenance performed by an outside contractor and charged back to the Proponent.

3.9.2 Grease Interceptors

(a) The Proponent will arrange for grease interceptors to be cleaned and serviced at their expense on a schedule approved by the Airport Authority. All work shall be carried out during off hours by the Airport Authority's contractor.

3.9.3 Kitchen Exhaust Fans

(a) For the International Terminal only - The Airport Authority will arrange for kitchen exhaust fans to be cleaned and serviced as frequently as determined by the Airport Authority. All work shall

be carried out during off hours by the Airport Authority's contractor and charged back to the Proponent.

(b) For the Domestic Terminal only - The Proponent will arrange for kitchen exhaust fans to be cleaned and serviced as frequently as determined by the Airport Authority.

3.9.4 Kitchen Exhaust Ecologizer Filters

(a) For the International Terminal only - The Airport Authority will arrange for kitchen exhaust ecologizer filters to be replaced as frequently as determined by the Airport Authority. All work shall be carried out during off hours by the Airport Authority's contractor and charged back to the Proponent.

4.0 - ELECTRICAL STANDARDS

4.0 ELECTRICAL STANDARDS AND GUIDELINES

4.1 General

4.1.1 **ELECTRICAL WORK MUST NOT BE CARRIED OUT ON ENERGIZED EQUIPMENT.**

All Proponent is required to complete a Building Services Shutdown Request Form to arrange for equipment to be de-energized prior to work commencing.

Shutdown forms are available on the Airport Authority's webpage (www.yyc.com) and must be submitted 5 business days prior to requested time of shutdown.

4.1.2 All conduit and wiring must be concealed from public view.

4.1.3 All coring requires a YYC Coring Permit and must adhere to the Coring Permit Request Procedures. Forms are available on the Airport Authority's webpage (www.yyc.com).

4.1.4 The Airport Authority ("Landlord") has supplied connections to the base building systems at designated points within the Lease Premises as identified on the Base Building Drawing.

4.1.5 It is the responsibility of the Proponent to check and verify actual on-site dimensions and conditions.

4.1.6 All wall and/or floor penetrations through a fire barrier within the Leased Premises must be fire stopped as required using only firestop products that have been ULC or cUL approved.

4.1.7 All floor penetrations within the Leased Premises must be fire stopped and sealed with an Airport Authority approved waterproof membrane (if existing).

4.2 Lighting Fixtures

4.2.1 All voltage supplied to base building light fixtures within the Leased Premises shall be either 347V or 120V, unless otherwise specified by the Airport Authority.

4.2.2 Energy saving requirements shall be considered for all new and replacement lighting systems.

4.2.3 No fixtures containing PCBs will be allowed.

4.2.4 When decommissioning or removing lighting fixtures and PCB ballasts are found, the Airport Authority Environment Department shall be notified as soon as possible.

4.3 Illumination Levels

4.3.1 Lighting levels must fall within the guidelines as outlined below:

Offices general area	330 LUX
Typing task area	850 LUX
Library area	755 LUX
Corridors and Stairwells	220 LUX
Washrooms	450 LUX
Ticket counter (surface)	850 LUX
Ticketing lobby	500 LUX
Customs baggage check (counter surface)	850 LUX
Departures lounge (counter surface)	600 LUX
Departures lounge (general area)	330 LUX
Baggage claim	600 LUX
Arrivals lobby	330 LUX
Concessions counters	750 LUX
Concourses and waiting areas.	330 LUX
Lunch rooms	330 LUX

4.4 Emergency and Exit Lighting

4.4.1 All exit lighting shall match existing fixtures in the Terminal Building. The most current standard fixture specification can be obtained from the Airport Authority.

4.4.2 All exit and emergency lighting shall comply with current National Building Code and Canadian Electrical Code requirements. Exit lighting/signage shall be CSA C860 (Performance of Internally Lighted Exit Signs) approved.

4.5 Electrical Receptacles and Switches

4.5.1 All switches and receptacle shall be specification grade.

4.5.2 All switches and receptacle should follow a colour code as follows:

Ivory	Normal power
Red	Emergency power
Orange	Isolated ground (emergency power)
Blue	Building UPS power

4.5.3 Branch circuits shall be identified on the exterior of the switch or receptacle cover plate.

4.5.4 Painting of switches and receptacles is prohibited.

4.6 Junction Boxes

4.6.1 All junction boxes shall be marked identifying circuit numbers and panel names.

4.7 Panels

4.7.1 All electrical drawings shall indicate panel number for each electrical panel within the leased premises.

4.7.2 The Airport Authority will confirm the availability of any isolated ground panels if required by the Proponent.

4.7.3 All breakers shall be matched to existing panels. Breakers shall be rated to conform to all Electrical Code requirements. The minimum interrupting capacity should be 10KA R.M.S. Sym.

4.7.4 All panel directories must be updated by the Proponent in existing or new panels and included in final as-built package submitted to the Airport Authority.

4.7.5 All panels must be identified with the appropriate lamacoid. Panel numbers shall be obtained from the Airport Authority.

4.7.6 All electrical panels shall be installed and finished to the satisfaction of the Airport Authority.

4.8 Wiring

4.8.1 Only copper conductors may be used. All wiring shall be copper RW 90 X-link, stranded.

4.8.2 All wiring shall meet the following minimum requirements:

600V insulation
#12 AWG for branch circuits
#14 AWG for control circuits

4.8.3 Colour coding shall be in accordance with Canadian Electrical Code for new equipment and circuits. New circuits terminating in existing equipment shall follow this colour coding:

Voltage	Colour
120/208V, 3 phase	Red, black, and blue
120/208V Emergency	Red, black and blue
347/600V, 3 phase	Red, black, and blue
347/600V Emergency	Red, black, and blue

4.8.4 When connecting to existing 347/600V circuits, match the color coding of that circuit. Colour coding will be as follows:

Voltage	Colour
347/600V, 3 phase	Orange, brown and yellow
347/600V Emergency	Orange, brown and yellow

4.8.5 Where multi-conductor cables are used, use the same colour coding system (as noted in number 4.8.1 above) for identification of wiring throughout each system.

All wiring up to and including No.2AWG copper shall be colour coded along the entire length

Reference Information *(See Appendix H)*
Alberta STANDATA bulletin 21-ECB-004(REV1)

4.8.6 All current carrying conductors shall be identified by using C.S.A. approved wire markers.

4.8.7 Liquid tight flexible conduit shall be used to connect equipment subject to vibration (maximum length of one metre).

4.8.8 A minimum 12.5mm (1/2”) flexible conduit and 90°C conductors (maximum length of one meter) may be used for connections to all light fixtures.

4.8.9 Any other use of flexible conduit within the Terminal Building requires special permission from the Landlord.

4.8.10 The use of BX or armored cable is prohibited within the Terminal Building.

4.8.11 All conduits must be EMT or Rigid, except by special permission from the Landlord.

4.8.12 Proponents are required to tag and identify all circuits.

4.8.13 Cables used in fire alarm systems must be installed in conduit and have a FAS rating.

4.8.14 **No conductors shall be installed in existing conduit systems without prior authorization from the Airport Authority.**

4.8.15 All E.M.T. connectors and couplings must be rain tight or steel set screw type. The use of cast metal type will not be permitted.

4.8.16 As-built drawings showing new conduits, cable runs, receptacles, panels, lights, circuit numbers, etc. are to be provided to the Airport Authority by the Proponent.

4.8.17 Conduits should not be run on the same support system as the communication tray.

4.8.18 Pack-poles to run cabling in public areas are not permitted.

4.8.19 **Panel indexes shall be updated and submitted to the Airport Authority Electrical Coordinator.**

4.9 Fire Alarm

4.9.1 Where applicable, the Airport Authority has supplied conduit to the Leased Premises. The Landlord contractor will tie-in the Proponent's fire alarm system to the base building system, at the Proponent's expense.

4.9.2 All of the Proponent's fire alarm components shall match the base building systems.

4.9.3 All alterations and installations are to be done by certified personnel, verified by an independent engineer.

4.9.4 The verification procedure shall comply with the requirements of the latest version of CSA/ULC-S537 (Verification of Fire Alarm Systems).

4.9.5 The fire alarm CCT's must be checked and verified by Landlord's contractor after modifications or changes have been made, at the Proponent's expense.

4.9.6 Where required by Code, additional fire detection devices shall be installed at the Proponent's expense.

4.10 Inspections and Permits

4.10.1 The Proponent is responsible for obtaining all necessary permits and approvals from the authorities having jurisdiction.

4.10.2 The Proponent is responsible for arranging and scheduling all necessary inspections by the authorities having jurisdiction.

4.10.3 The Airport Authority shall inspect all electrical work prior to such work being enclosed within walls, floors and/or ceilings.

4.11 Demolition and Removal

4.11.1 Any electrical systems which are no longer required by the Proponent - or are to be abandoned - must be removed from the Leased Premises. Removal shall extend to the last junction box, sub-panel, or panel as the case may be.

4.11.2 All panel knock-outs shall be plugged with appropriate plugs, and all breaker locations shall be filled with appropriate blanks.

4.11.3 All panel directories and junction box labels shall be updated. The updated panel directories shall be submitted to the Airport Authority.

5.0 - SUBMISSION REQUIREMENTS

5.0 SUBMISSION REQUIREMENTS

Proponent projects will be subject to a thorough review and approval process by the Airport Authority. A complete submission shall include:

- Construction & Installation Permit Application
- Design and Drawing Package
- Development Security Deposit (where applicable)

Note: In the course of the project review, the Airport Authority may request additional information from the Proponent to obtain a clear understanding of the development proposal.

Applications will be assigned a Development Coordinator who will be responsible for the review and approval of the project. The Development Coordinator shall remain the Proponent's primary contact throughout the project until its completion.

It is the Proponent's responsibility to confirm actual site conditions, verify all job dimensions against the base building information provided by the Airport Authority and review all conditions of the Construction Schedule of the Lease Agreement, (if applicable).

5.1 Construction & Installation Permit

All development at Calgary International Airport follows the Construction & Installation Permit (CIP) process. This process involves the submission of a design package (which will include detailed drawings of the proposed project, materials sample board, and other relevant design information as required) and a completed Construction & Installation Permit (CIP) application to the Airport Authority for review and approval.

The Airport Authority will conduct an internal review of the proposed project, and, working with the Proponent and their design/construction team, obtain all necessary revisions or modifications to the proposal based on the requirements and recommendations of the Airport Authority's internal review.

As part of the review and approval process, the Proponent will be required to obtain a City of Calgary Building Permit prior to the Airport Authority giving approval for construction to commence. The Airport Authority will issue a "Letter of Authorization" for the Proponent to apply to The City of Calgary for a building permit when required. A copy of the approved building permit must be submitted to the Airport Authority prior to a CIP being issued. **Note: an approved building permit does not constitute final approval for a CIP application.**

Once all necessary information has been received (including a City of Calgary building permit) to the satisfaction of the Airport Authority, a Construction & Installation Permit shall be issued, authorizing the Proponent to commence construction. At the conclusion of the project, the Proponent will be required to submit a complete set of "as built / record" drawings to the Airport Authority.

5.2 Construction Drawings

Construction Drawings shall be submitted in the form of one (1) set of black line prints and one set of electronic files, unless otherwise approved by the Development Coordinator. Airport Authority CADD standards are provided (Appendix B) to ensure design firms using Airport Authority CADD drawings are able to understand the information. While Proponents are not required to adhere to Airport Authority CADD standards, it is recommended for easier sharing of information.

The Proponent must engage the services of licensed professionals in the design of architectural, mechanical and electrical drawings for construction and approval purposes. Drawings must bear the seal of a registered professional licensed to practice in the Province of Alberta.

In general, all drawings are to be presented in a standard B1 size format, information is to be metric and drawing text shall be a minimum of 2.5 millimetres and suitable for 1/2 size printing and scanning. All Drawings are to be scale drawings with dimensions, and are to include the following:

- Key plan, showing location of project within the Terminal (this key plan should be at a scale large enough to show required exits/access to exits, proximity to washrooms, etc.)
- Detailed floor plans
- Exterior and interior elevations
- Sections and details, as required
- Reflected ceiling plans, as required
- All signage, including type, materials, size, and location
- Structural, mechanical, electrical, and telecommunication/data drawings as required, including details and performance characteristics of all equipment.
- Drawings shall show utility connection locations as well as the size of services. Where necessary, special systems or equipment drawings shall be submitted.

Standard Notes:

The following notes should appear on all drawings submitted for approval:

- “One set of Issued for Construction Approved Drawings to be kept on site and available for checking at all times during construction.”
- “All materials to meet flame spread rating requirements of authorities having jurisdiction.”

- "All work to be scheduled through the Development Coordinator so that it does not interfere with Airport operations."

In addition to the above, the drawings should indicate:

- Leasehold location, configuration, name and leasehold reference number on a key plan.

5.3 Copyright Assignment

Proponents designing facilities which are to be constructed on land sub-leased from the Airport Authority, or in buildings situated on Calgary Airport lands should be aware from the outset of discussions that the following paragraphs form part of the standard Lease Agreement. These paragraphs may have implications on the agreements that a Proponent will need to make with its consultants. The requirements set out below should be considered when entering into any design, design-build or consulting contract. These are obligations, which the Airport Authority is obliged to require of its Proponents under its Lease Agreement (Head Lease) with Transport Canada.

5.3.1 Prior to the commencement of construction of any Leasehold Improvement or installation of any utility, service or road, (collectively the "Project"), the Proponent shall provide and shall ensure that any Occupant provides the Landlord with satisfactory evidence that the Proponent or any Occupant, as the case may be, has obtained from the design, architectural and engineering consultants responsible for the preparation and creation of all design, construction and specification documents for the Project, an assignment and irrevocable non-exclusive license of the copyright of the design, construction and specification documents relating to the Project in favour of the Landlord and the Crown for the purpose of the Project only. Such assignment and license shall not include the right to use or duplicate any identifying logo, mark, trademark or industrial design of the Proponent or of any Occupant or Transferee, nor shall such assignment and license grant any proprietary right whatsoever to the Landlord or to the Crown of any such identifying logo, mark, trademark or industrial design. The Agreement providing such assignment and license shall expressly state that neither the Landlord nor the Crown shall be responsible for any costs or expenses incurred or to be incurred in connection with the preparation of such design, construction and specification documents or their subsequent use by either the Landlord or the Crown, and that both the Landlord and the Crown are entitled to use the design, construction and specification documents for any purposes related to the Project whatsoever, at any time, without any further consent and without any further payment.

5.3.2 At the completion of the construction of the Project, the Proponent shall deliver to the Landlord, and shall ensure that any Occupant deliver to the Landlord, two (2) sets of reproducible "As Built" design, construction and specification documents with respect thereto, including copies of any electronic data embodying such documents and any program required for

the use and interpretation of such data. The Landlord acknowledges that the design, construction and specification documents, the electronic data and program, as aforesaid, are valuable to the Tenant. The Landlord shall be entitled to use such design, construction and specification documents, electronic data and program only for such purposes as contemplated by this Lease or for any purpose relating to the Project after expiration or early termination of this Lease. The Landlord shall not disclose such documents, electronic data and program to any third party other than as is reasonably necessary for the purposes, as aforesaid; PROVIDED ALWAYS, that the Landlord shall be permitted to provide such documents, electronic data and program to the Crown in order that the Landlord may comply with its obligations in respect thereof under the Head Lease.

5.4 Construction Specifications

For all projects, one hard copy of the Construction Specifications, utilizing the National Master Specification (NMS) format shall be submitted in PDF format. Alternatively, a detailed outline, in written form, of the scope of work involved may be submitted.

5.5 Sample / Colour Boards

Sample/colour boards are required for all concession developments and may be required for other types of leased space development, as determined by the Airport Authority. Boards shall include samples of proposed finish materials and colours, including but not limited to:

- Paint colour samples
- Floor and wall covering samples
- Surface materials (such as stone or solid surface) samples
- Illustrations of proposed lighting fixtures
- Millwork finish samples

5.6 Colour Perspective Renderings (Concessions)

At least one colour perspective rendering of the concession storefront is required. The rendering must provide accurate visual representation of the colours, materials and finishes being proposed for the space. Additional renderings depicting other areas of space should be included as required.

5.7 Development Security Deposit

A refundable Development Security Deposit is required for all Proponent development projects and is returned to the Proponent once all the terms and conditions of the CIP have been fulfilled. The amount of the deposit will be determined by the Airport Authority based on the Proponent's estimated project

cost (up to a maximum 5% of the project cost) Approval to commence construction will not be issued until the deposit has been received (Appendix I – Development Security Deposit Policy).

6.0 - CONSTRUCTION RULES

6.0 CONSTRUCTION RULES

Based on the Landlord's experience and to incur the least amount of inconvenience to all concerned, the following rules and requirements are applicable to all Proponents upon starting their construction work. These requirements will be enforced to ensure that there is no interruption to other businesses or public movement.

6.1 Commencement of Work

Unless otherwise expressly permitted or required by the Airport Authority, no work may commence, and the Proponent may not have possession of the Leased Premises until the following conditions have been satisfied:

- The Airport Authority has issued a Construction & Installation Permit (CIP).
- The Airport Authority has approved the design and the Proponent has submitted a construction schedule complete with 24-hour emergency contact list.
- All necessary approvals and permits of municipal and other governing authorities having jurisdiction over the Proponent's work have been obtained.
- The Airport Authority has approved the designated prime contractor.
- The Airport Authority has provided notification in writing of the date the Leased Premises are ready for the commencement of work and upon which the Proponent is to take possession.
- The Lease Agreement has been fully executed.
- The Airport Authority has received a development security deposit from the Proponent.

6.2 Coordination / Start–up Meeting

Prior to commencing work, a site meeting shall be arranged by the Development Coordinator. A representative of the Proponent, the Proponent's contractor, and anyone else deemed essential to the project (such as major subcontractors, the Proponent's consultants, etc.) are required to attend.

Scheduling and coordination of all work shall be discussed including:

- All essential base building services to be maintained during construction.
- Safety entry and egresses to be maintained.
- Verification of construction schedule.
- Verification of requirements for fire safety and construction safety to be maintained.

- Noise and dust control regarding normal building operations.
- Verification of site access, storage areas and parking.
- Scheduling of critical shutdowns and change-overs.
- Roles and responsibilities related to the ongoing management of the construction project (including establishing emergency procedures, general lines of communication, etc.).

6.3 Public Safety

It is the responsibility of the Proponent to ensure that its contractors exercise all caution in matters relating to construction and public safety and to comply with the Occupational, Health and Safety standards established by authorities having jurisdiction.

Where applicable, the Proponent shall designate a member of its' contractors' forces as the Prime Contractor responsible for worksite safety for the project.

From time to time, the Airport Authority may issue to a Proponent's contractor safety instructions, which must be strictly adhered to. All work is governed by the latest Construction Safety Act and the Proponent's contractor must abide by the Airport Authority's representative in these areas when required.

6.4 Security

Security of the Leased Premises during the construction and fixturing period is the sole responsibility of the Proponent. The Airport Authority assumes no liability for any loss or damage including the theft of building materials, equipment or supplies.

It will be necessary for all Proponents and construction personnel to comply with all applicable security legislation and regulations in effect at the Airport.

- Conditions of Issue for RAIC & Temp Passes
- Conditions for Holding Visitor Passes
- Conditions for Holding Construction Visitor Passes
- Duties and Responsibilities of Visitor Sponsor and Escorts
- Application for Keys and Access
- Locksmith Service Request Form

Documents and information related to the above regulations as well as other security related requirements are available from http://www.yyc.com/en-us/businessatyyc/passoffice.aspx

6.5 Working Hours

The Proponent's contractors and suppliers will be subject to restrictions, which may be imposed by the Airport Authority in regard to deliveries, hours of work, scheduling and co-ordination of work including, but not limited to night shifts and weekends.

It is the responsibility of the Proponent to coordinate with the Development Coordinator the approved hours of work for their construction forces.

Access to the Leased Premises for construction personnel and the delivery of material will be subject to restrictions imposed by the Airport Authority and the location of the Work.

All Proponent's must park in the parkade or the over height lot. Long term parking is available in the "green lot" but the Proponent must make arrangements to obtain and pay for passes. Trailers are not permitted except by special permission of the Airport Authority.

6.6 Material Delivery

The Proponent must coordinate the time, location, routing and method for all deliveries relating to the construction of the Leased Premises with the Development Coordinator.

No construction material may be delivered through public areas without prior consent of the Airport Authority and no construction material may be stored or stockpiled in any public area.

6.7 Garbage Removal

The Proponent will be required to remove all construction debris on a daily basis. The timing for garbage removal and the location of bins must be coordinated with the Development Coordinator. In areas where the work is "airside", measures must be taken to ensure that all garbage is enclosed and does not present a danger to airside operations (FOD - Foreign Object Damage). Temporary storage of garbage or debris outside of the Leased Premises will not be permitted.

6.8 Construction Hoarding

The Proponent should anticipate the requirement to install temporary hoarding in front of the Lease Premises unless otherwise directed by the Airport Authority.

The hoarding should be of non-combustible metal stud and drywall construction sealed at the top and painted white with a 100mm high rubber or vinyl cover base to the Airport Authority's approval.

The hoarding should be located a maximum of 900 mm (3'-0") in front of the Lease Line where possible and should be equal in height to the full premise opening. The top should be secured with polyethylene.

To protect the public concourse or walkway finish, plywood strips should be attached to the bottom of the hoarding. This will facilitate the moving of any hoarding if required during working hours. Hoarding should be securely braced into the Leased Premises behind the Lease Line. No mechanical fastening to the base building floor or structure will be permitted.

As an alternative hoarding may also be constructed of environmentally friendly reusable PVC panels installed as per manufacturers recommendations such as Greenlocä. Approval from YYC is required prior to installation.

Where construction is being done in tandem with any base building or Airport Authority construction, the Airport Authority at the Proponent's expense may undertake the erection of the Proponent's hoarding.

Access to the Leased Premises for construction purposes should be from a rear corridor location or through a 900 x 2035 painted hollow metal door and frame complete with lockset. The Proponent shall provide the Development Coordinator with two sets of passkeys.

When a hoarding wall becomes the Prime Security Line (PSL) for a leased area the interior of the hoarding wall needs to be identified as a PSL. YYC Security is required to inspect all PSL hoarding walls.

Hoarding must remain in place until authorization is received from the Development Coordinator. If there are any major deficiencies found, the Proponent may be required to re-install the hoarding until deficiencies are corrected.

6.9 Temporary Electrical Service

The Airport Authority, through its contractor when active on site, may provide at the Proponent's expense, temporary electrical service required during the construction phase.

6.10 Fire Ratings

During construction or demolition, care must be taken by the Proponent to maintain existing fire walls, fire proofing and fire dampers in ductwork, notwithstanding any other work that may affect the fire rating requirements of authorities having jurisdiction. If the Proponent causes any damage to the fire rating, the Airport Authority will advise the Proponent to perform the necessary repairs or the Airport Authority will repair such damage at the Proponent's expense.

6.11 Building Codes

It is the Proponent's responsibility to fully comply with all applicable governing codes and ordinances for their occupancy type. See Appendix E - Building Code Requirements for Tenant Occupancies.

6.12 Permits

The Proponent is responsible for obtaining at its own expense all approvals and/or permits pertaining to its space from all authorities having jurisdiction prior to commencement of construction. All approvals and permits should be posted in a visible location.

6.13 Deficiencies

The Proponent should make good any deficiencies discovered by the Airport Authority or by City of Calgary building inspectors whether in its own premises or in adjacent premises affected by the construction. Failure to comply with a written request within 30 days will cause the Airport Authority to correct deficiencies at the Proponent's expense.

6.14 Clean-Up

The Proponent should ensure proper clean-up of all areas related to its work to the satisfaction of the Airport Authority prior to opening for business.

7.0 - PROJECT COMPLETION

7.0 PROJECT COMPLETION

7.1 Final Inspection and Acceptance of the Work

The Proponent shall notify the Airport Authority in writing when all deficiencies are complete and final clean-up has been done. The Proponent along with the Airport Authority will make a final inspection to ascertain if the Work has been fully completed in accordance with the approved detail drawings.

7.2 Occupancy Permit

The Proponent is responsible for obtaining an Occupancy Permit from the City of Calgary prior to commencing operations. Proof of the Occupancy Permit must be submitted to the Airport Authority prior to commencing operations.

7.3 Statutory Declaration

A Statutory Declaration is a legal form completed by the Proponent and witnessed by a Commissioner of Oaths, Notary Public or Justice of the Peace at the end of the construction period stating to the Owner, in this case the Proponent, that it has discharged all its lawful obligations with respect to the performance of the Contract, including without limitation, payment of all accounts for labour, subcontractors, suppliers, debts arising out of statutory requirements, and other indebtedness which may have been incurred, up to the date specified.

At the Airport Authority's request, the Proponent should submit to the Airport Authority, its Contractor's Statutory Declaration as required under the Construction Schedule. The Proponent will also furnish evidence of compliance with the requirements of the Workers' Compensation Act as required under the Construction Schedule.

7.4 Record Drawings

At the end of the construction period and within the time period specified by the Lease, the Proponent must provide the Airport Authority with one (1) set of good quality reproducible prints of all drawings, CAD files and one set electronic files as specified by the Development Coordinator, documenting all as-built conditions. If the required documentation is not received by the Airport Authority within the specified time period, the Airport Authority will undertake the work at the Proponent's expense.

8.0 – OTHER AREAS

8.0 OTHER AREAS

8.1 Rental Car Centre / Parkade

All ATB standards apply within the Rental Car Centre and the Parkade.

8.1.1 Vehicle Rental Buildings - Drawings attached as Appendix 'I'.

Where space is available, support buildings for vehicle rental agencies are to be located on the third level of the Parkade. Only one building will be allowed per car rental agency.

Vehicle Rental Buildings shall - at a maximum - take up the equivalent of two parking spaces. Unless otherwise approved by the Airport Authority, the following dimensions shall apply to all vehicle rental buildings:

Width: 4000mm (13'-0")

Depth: 3800mm (12'-6")

Height: 3000mm (10'-0")

Dimensions are inclusive of curbing, steps, and ramps located outside of the building's exterior walls.

Protective curbing must be provided for all exposed walls. Such curbing shall be in the form of a poured-in-place concrete curb, or pre-cast concrete parking bumpers.

Entrances to vehicle rental buildings should be positioned so as to avoid conflict with vehicles and pedestrians.

Buildings should only be constructed of fire resistant materials. Wood frame construction is strictly prohibited. Wood may only be used for interior casework or millwork.

Exterior finishes are restricted to clear anodized aluminum siding.

Window glazing should be clear and sealed in clear anodized aluminum frames, equal to Kawneer Insuline 500 series.

Exterior doors should be sealed and glazed in clear anodized aluminum frames equal to Kawneer 190 narrow stile series.

Exterior lighting is limited to the illumination of access routes or for safety purposes. Decorative lighting will not be permitted.

Exterior signage is limited to one (1) fascia identification sign per elevation. Signage is restricted to a 500mm high sign band set at 2500mm to 3000mm above the Parkade floor slab. The maximum lettering height is restricted

to 400mm. Exterior signage is restricted to backlit illumination only and should conform to CSA requirements.

All parking stall identification signs are limited to 400mm x 400mm in size unless otherwise approved by the Airport Authority. The top of all signs must be set at 1800mm above the curb.

At the Airport Authority's discretion, car rental agency identification signs may be allowed on the pre-cast concrete ceiling tee joists within the Parkade. These signs should be mounted using small amounts of adhesive. The Proponent is responsible for the removal of all mounting adhesive if the signage is relocated or removed. No holes shall be drilled into the structural ceiling tee joists due to the existence of pre-stressed cables.

Alternative methods for providing parking stall identification signage and/or car rental identification signage may be considered by the Airport Authority, but specific approval will be required.

Electrical power is available in the form of 120/208, 3 phase. The Proponent shall be responsible for all connections, conduit, and wiring to the building site. Heating, if required, shall be electrically generated. Water and sewer services are not available.

(a) Sign Guidelines

All interior and exterior sign proposals must be approved by the Development Coordinator, prior to installation.

8.2 Airport Terminal Reserve

8.2.1 Ancillary Buildings

Proponents proposing to install buildings within the Terminal Campus must receive approval from the Development Coordinator.

Temporary buildings must be constructed and finished in a high quality and should complement the colors and finishes of the surrounding buildings. The Airport Authority will discourage the use of temporary sheds and trailers.

Both temporary and permanent buildings require approval/permits from the City of Calgary. Such approvals can only be obtained with the written permission of the Airport Authority. See item 1.2.

8.3 Airport Corporate Centre

Although the standards laid out in this document do not apply to the Airport Corporate Centre, Proponents in this building still require a Construction & Installation Permit (CIP) from the Airport Authority. See item 1.2.

Prior to obtaining a Building Permit from the City of Calgary, the Proponent is required to obtain a letter of approval from the Development Coordinator.

The Proponent is required to obtain development and construction approval from Dundee Realty Management Corporation prior to submitting an application to the City of Calgary and the Airport Authority.

Contact Info:

Mr. Gordon Spooner
Property Manager, Associate
Group Three Property Management Inc.
#300, 10240 – 124 Street
Edmonton, Alberta T5N 3W6

780.641.0232 (phone)

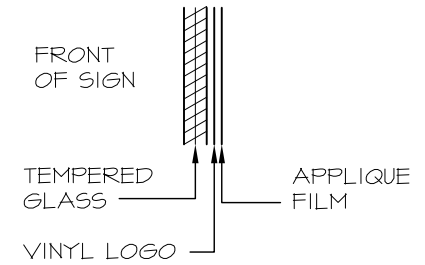
gspooner@groupthree.ca

APPENDIX A – OFFICE SIGNAGE DETAIL AND PLACEMENT

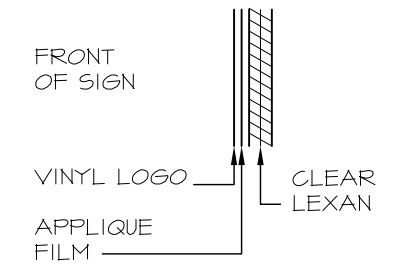
SIGNAGE MATERIAL SPEC'S:

SIGNANGE TO BE EITHER:

1. -¼" OR 6mm CLEAR TEMPERED GLASS /W EASED EDGES.
   -VINYL LETTERING/LOGO APPLIED TO THE BACK OF THE GLASS
   -HEXIS ETCHED GLASS HIGH PERFORMANCE S5DEPM-SILVER (OR EQUAL) FILM APLIQUE ACROSS THE ENTIRE REAR SURFACE OF THE SIGNAGE.



2. -VINYL LOGO/LETTERING
   -HEXIS ETCHED GLASS HIGH PERFORMANCE S5DEPM-SILVER (OR EQUAL) FILM APLIQUE COVERING THE SURFACE OF THE SIGNAGE
   -¼" OR 6mm CLEAR LEXAN W/ CLEAR HEAT POLISHED EDGES.



YYC CALGARY AIRPORT AUTHORITY

PROJECT

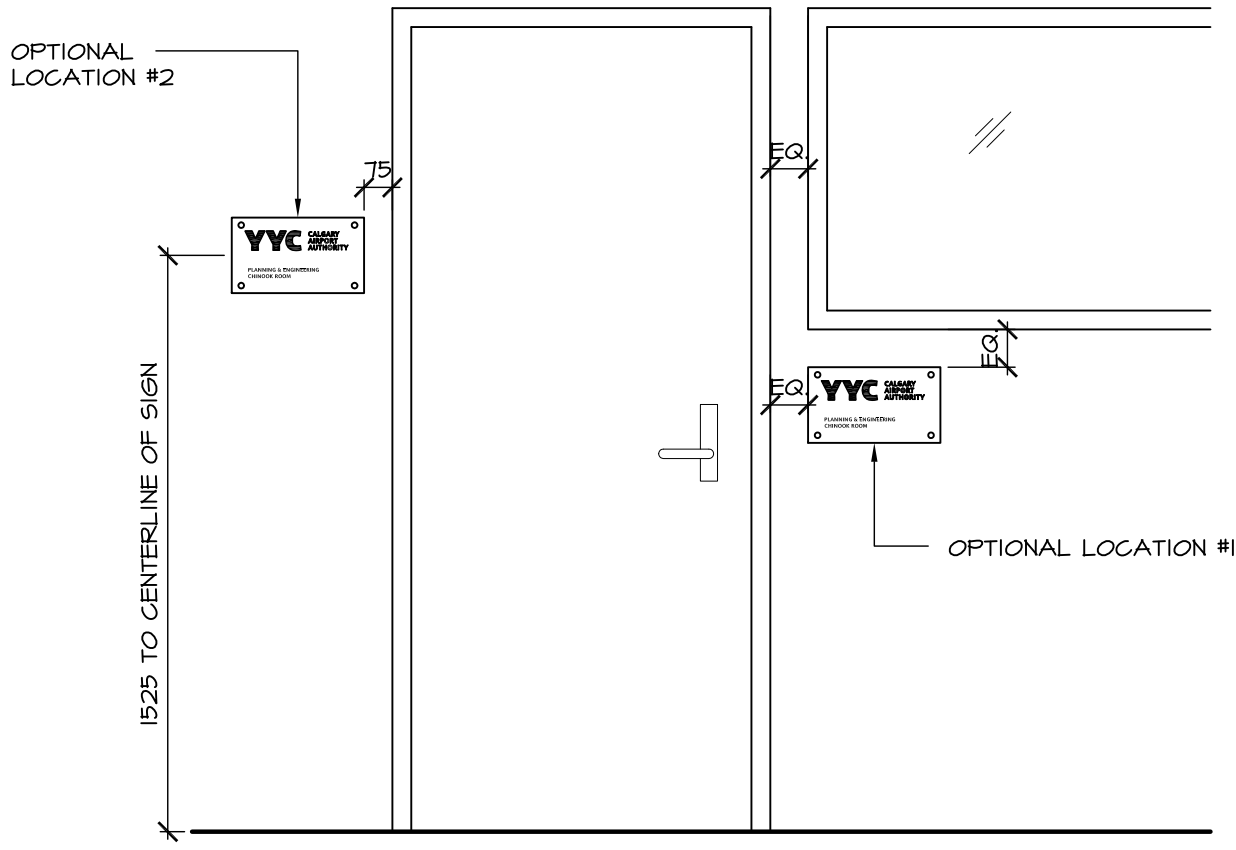
CALGARY INTERNATIONAL AIRPORT

OFFICE SIGN DETAIL

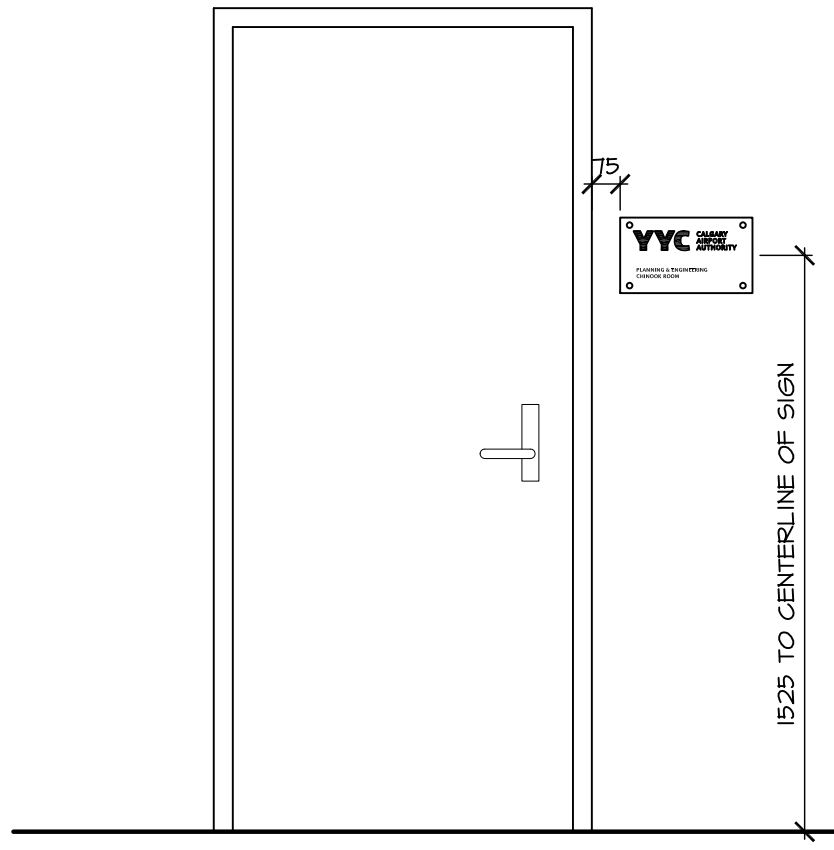
DRAWING

CADD FILE No.	PROJECT No.	DRAWN BY	SCALE	DATE	SHEET
		ADG	1:2	2009.05.22	K-01

Name: Office Signage.dwg Date: Jul 08, 2009 Time: 3:44 PM



1 K-02 SIGN PLACEMENT:
DOOR ADJACENT TO WINDOW
SCALE: 1:20



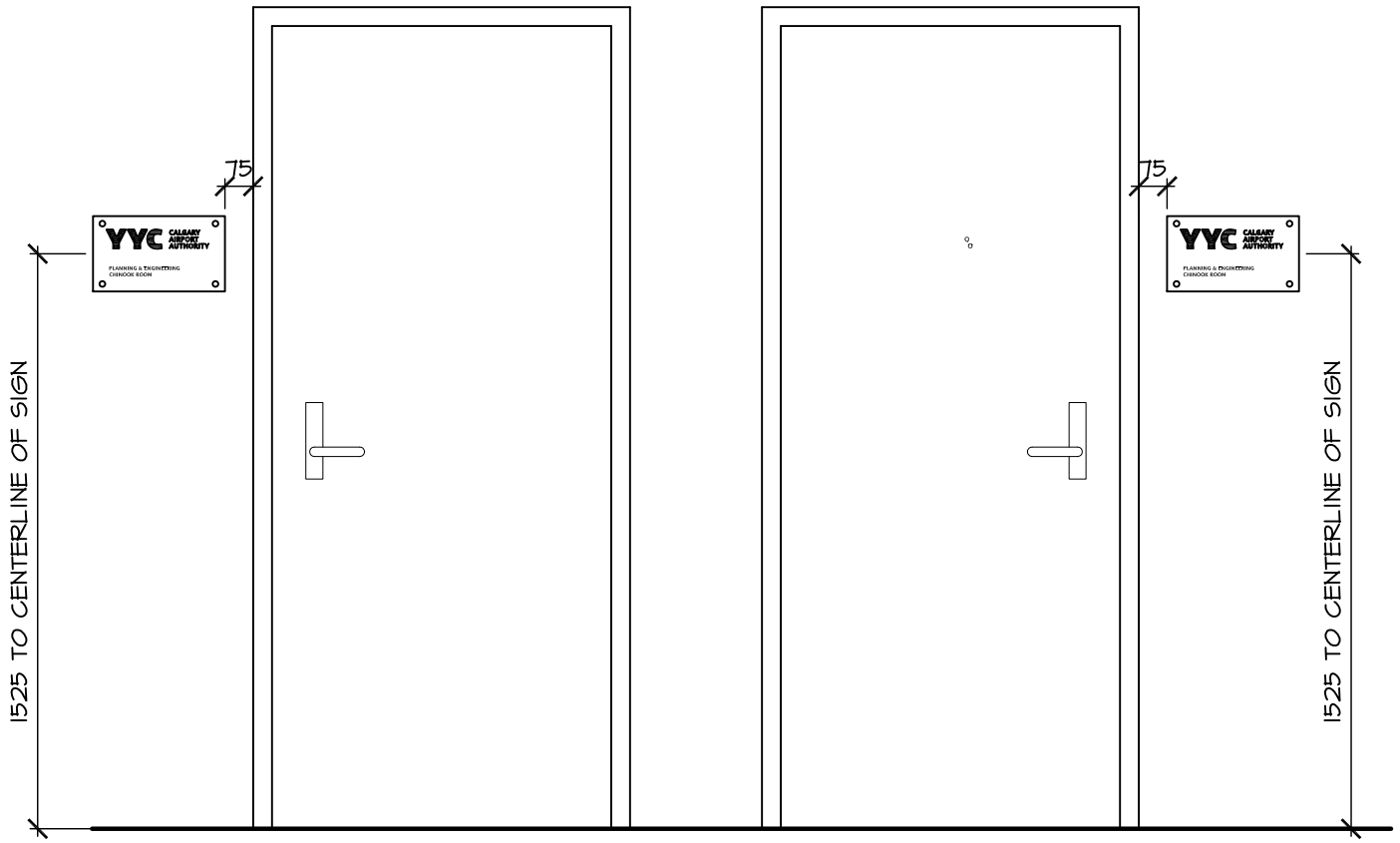
2 K-02 SIGN PLACEMENT:
TYPICAL OFFICE DOOR
SCALE: 1:20

YYC CALGARY AIRPORT AUTHORITY

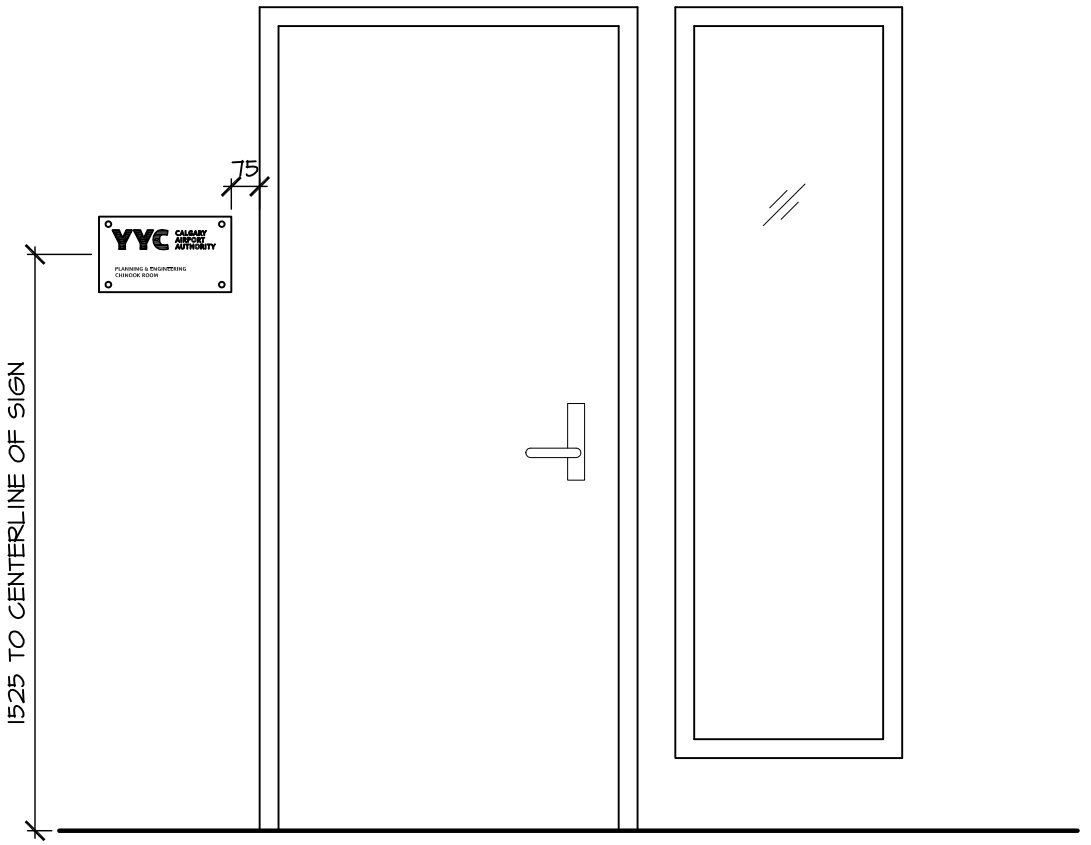
PROJECT
CALGARY INTERNATIONAL AIRPORT
OFFICE SIGN PLACEMENT
DRAWING

CADD FILE No.	PROJECT No.	DRAWN BY	SCALE	DATE	SHEET
		ADG	1:20	2008.05.28	K-02

Name: Office Signage.dwg Date: Jun 18, 2009 Time: 2:39 PM



1 K-03 SIGN PLACEMENT:
TWO DOORS CLOSE ADJACENCY
SCALE: 1:20



2 K-03 SIGN PLACEMENT:
DOOR C/W SIDELIGHT
SCALE: 1:20

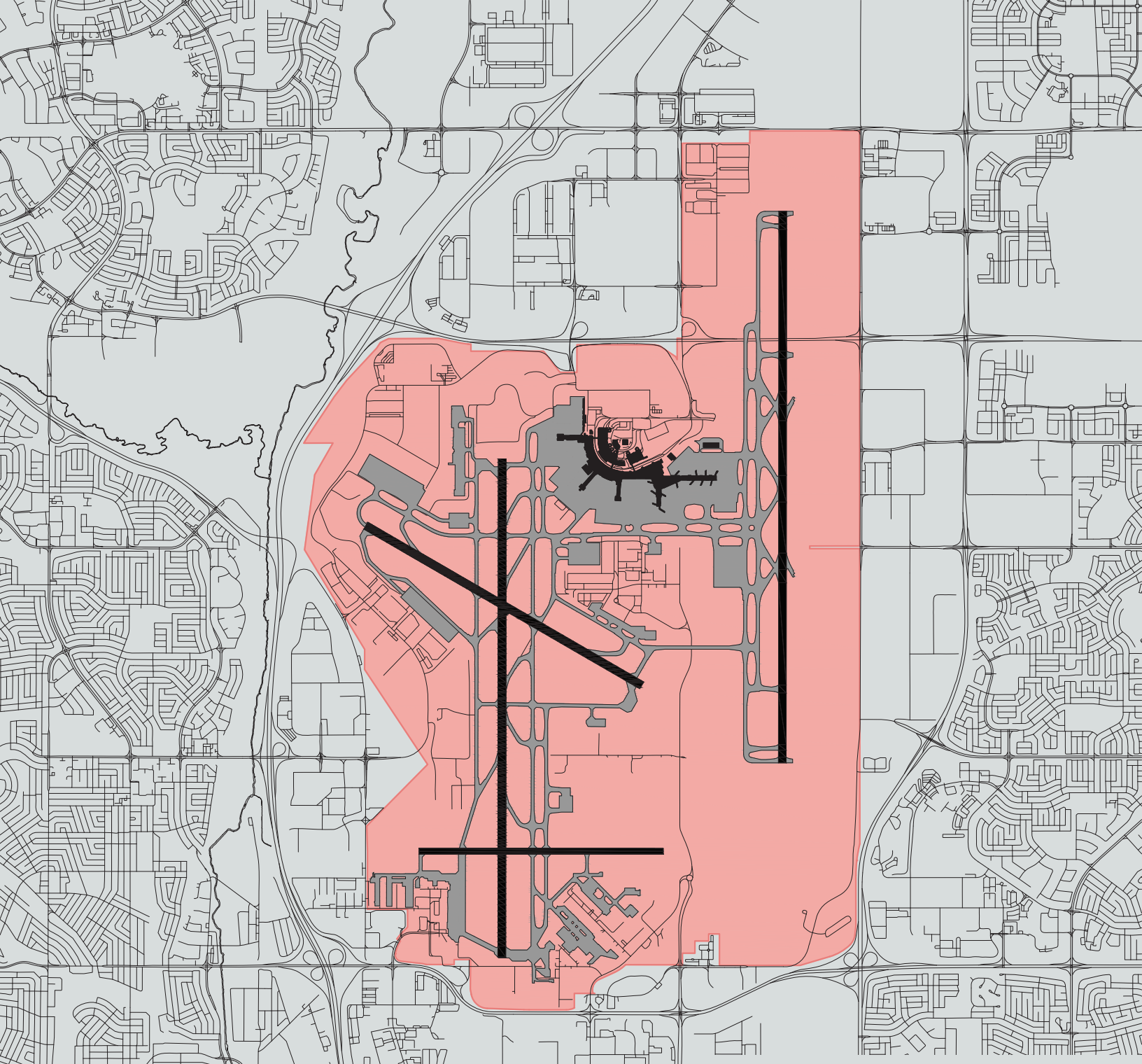
YYC CALGARY AIRPORT AUTHORITY

PROJECT
CALGARY INTERNATIONAL AIRPORT
OFFICE SIGN PLACEMENT
DRAWING

CADD FILE No.	PROJECT No.	DRAWN BY	SCALE	DATE	SHEET
		ADG	1:20	2009.05.28	K-03

Name: Office Signage.dwg Date: Jun 18, 2009 Time: 2:39 PM

APPENDIX B – YYC CADD Manual



CAD

SITE/CIVIL & TERMINAL CAD STANDARD

VERSION 6.1 - MARCH 14, 2023

YYC™ CALGARY AIRPORT AUTHORITY

Index

1.0 INTRODUCTION

1.1 Background

This Computer Aided Design and Drafting Standards package is to be used on all Calgary Airport Authority (Airport Authority) projects. These standards have been developed as a guide and overview for all disciplines of CADD on internal and contractually submitted electronic drawing file formats. Highlights within this manual include file format, naming conventions, layering, drawing assembly and general drafting procedures.

Consultants shall contact Spatial Data Services (SDS) for updates and revisions to the standards and must ensure the most current issue of the Airport Authority CADD Manual is being used.

The file structure, drawing numbering, primary layer names and standard detail symbology shall be adhered to. Changes to the standards symbology or layering groups may be considered upon formal request to SDS. The Airport Authority must approve these modifications, in advance, and the modifications shall be documented in writing with the drawing submission.

Work created for the Airport Authority is protected by copyright. The Airport Authority in its master contract is to receive ownership of the information. This is so the information may be reused and provided to other consultants who require this information to carry out their work on Airport Authority projects. In addition, the head lease the Airport Authority has with the Federal Government ensures the Airport Authority receives transfer of copyright on all its consultant designed projects.

Facility record drawings are maintained by the Airport Authority SDS. These drawings have been created by pulling together information from past project as-builts, record drawings, and site surveys. As new projects are completed and record drawings delivered, these new areas are added to the facility record drawings. While every attempt is made to ensure the data in the record drawings is correct, any areas critical to the project should be verified by field checking. Access to past record drawings and associated data is permitted and can be arranged through Airport Authority Project Managers / Project Coordinators.

The Airport Authority is currently using Autodesk Map 2022, AutoCAD Architecture 2022, AutoCAD Civil 3D 2022 and AutoCAD Raster Design 2022. The airport has adopted the use of the AIA Layer Guidelines - Long Layer Name Format for its CADD layering convention.

2.0 GENERAL REQUIREMENTS

2.1 Delivery Media and Format

All information described in section 2.0 of this document is to be included in the electronic data deliverables. Any additional files developed as part of the project such as construction specifications, XML Databases shall also be provided with the drawing sets. Deliverables are to be provided via CD / DVD / USB STICK / FTP SITE.

Drawing files will be saved in AutoCAD 2018 .dwg format. The submitter is responsible for archiving the electronic data until final written acceptance from the Airport Authority has been issued. Electronic data deliverables are required with all major submittals unless otherwise directed by Contract Agreements.

Filenames:
- drawing/filename provided by the Airport Authority
- long filenames will be accepted by the Airport Authority
- refer to Section 3.2 for file naming conventions

2.2 Disk Labelling

If submitting data by disk, they must be labelled as follows:

Date:	Delivery date to the Airport Authority for final acceptance
Project Name:	Title of Project
Project Number:	Airport Authority Project Number
AutoCAD Release:	AutoCAD version drawing was created in
Company Name:	Name of consultant to the Airport Authority
Phone:	Phone number of consultant

2.3 File Description

The electronic data delivery package shall include a File Description note. The note shall be an 8 ½" x 11" PDF and describe the master files and associated x-reference files on the CD / DVD / USB Stick. A basic file list may be started using a dos shell command "dir /b /on > text.txt". This creates directory listing in brief format (name only) sorted by name output to a text file. This file may them be edited adding the full description of the file and the corresponding layout tab(s).

Sample Hard Copy of File Description:

2023/01/13
CALGARY AIRPORT AUTHORITY ELECTRONIC DATA - FILE DESCRIPTION

Prepared for:
Calgary Airport Authority

Prepared by:
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Project: Concourse A Holdroom
Project Number: 4567
Contract Number: 1234

Remarks:
Paper and model space used in this file format
Font, Linetype, and CTB files used in plotting are enclosed

File Description:
23c04a01.dwg - Demolition and Room Layout
23c04a02.dwg - Wall Sections
23c04a03.dwg - Details
23c04m01.dwg - Mechanical Layout
23c04e01.dwg - Electrical Layout

2.4 Standard Coordinate Systems

Drawings generated for the Calgary Airport Authority may be one of two Coordinate Systems. One is for Site Mapping, the other for the Building Facility Drawings. To confirm the Coordinate System the particular drawing uses, view the drawing coordinates from within model space using the user Coordinate System (UCS) set to world. The following examples are for the Air Terminal Complex Grid Center. This is located on the northwest wall of the Services Building. This location is also an Alberta Survey Monument **#156646** (Airport Authority Tablet **#702113**). The monument is used by both systems but will display different values depending on the Coordinate System used.

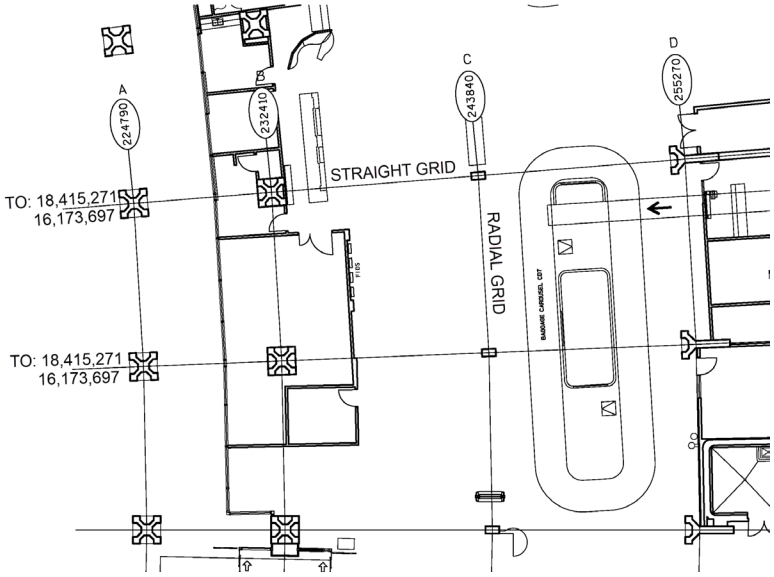
Site Mapping
Airport Authority Site mapping uses the Alberta **NAD83 datum; 3TM coordinate system centered at 114 degrees West**. The coordinate for the above sample monument is:
North **5,666,270.420** and East **–559.815m**.
The world UCS coordinate system in AutoCAD model space will reflect these values.
Units used in these drawing are METERS.

Building Facility
Building drawings (ATB, Parkade, Services Building, etc.) are set to a **Local Airport Coordinate System**. Using the monument example above, the AutoCAD world UCS coordinates in model space will display the coordinates of: North **18,415,271**, East **16,173,697**. ***Units used in these drawing are MILLIMETERS***.

When drawing in the ATB, elements are typically drawn parallel and perpendicular to the segmented radial grids, NOT the straight grids. This necessitates rotating the view

of the drawing. **DO NOT ROTATE OR MOVE THE ELEMENTS THEMSELVES**. One method of rotating the view without disturbing the drawing is to select a plan view of the UCS equal or perpendicular to the radial grid in the area the new elements are to be drawn.

Example: (In model space, we are going to rotate the view around an object)
Command: **UCS**
Specify origin of UCS or [Face/NAmed/OBject/Previous/View/World/X/Y/Z/ZAxis] <World>: **OB**
Select object to align UCS: **(Select an end of a line closest to the new left side of the view)**
Command: **PLAN**
<Current UCS>/Ucs/World: C



3.0 FILE MANAGEMENT

3.1 Project Directory Structure

Directory structures shall be created for all Capital projects. Projects not requiring all disciplines do not need to have all discipline levels created. All drawings will be located within the directory structure as indicated below.

Project Number Level – this number will be provided by the Airport Authority Project Manager. It consists of two parts: a location identifier code and project number in a format similar to the following example 5020-4008 (5020 being the location identifier and 4008 being the project number). Projects that require multiple tender packages should consider using TP01, TP02, TP03, etc to help define different packages within the project. If this method is used seek further clarification from the Project Manager / Project Coordinator. No drawings shall be located at this level.

Discipline Level - only title block/fence drawings (.dwg) are located at this level. Details, plans etc, from component level will be X-referenced onto title block/fence drawings from the BLK directory.

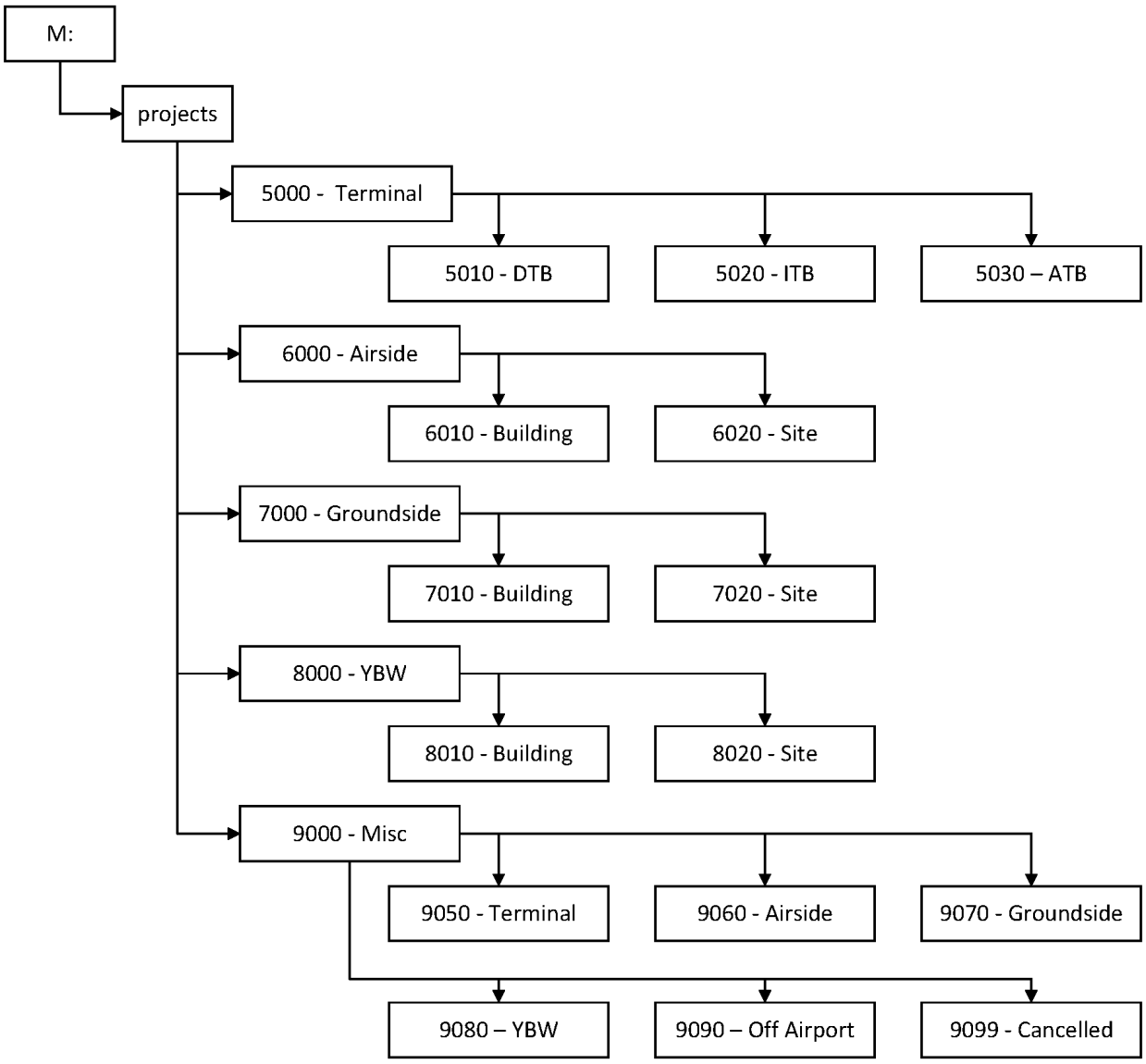
A	*Architectural Drawings*
C	*Civil Drawings*
E	*Electrical Drawings*
I	*Interiors Drawings*
M	*Mechanical/Plumbing/Fire Protection Drawings*
S	*Structural Drawings*
T	*Telecom Drawings*
Spec	*All Discipline specifications, schedules, addendums*
Admin	*All administrative files such as correspondence, technical data, production drawing lists and schedules etc.*

Component Level
BLK - Final drawing component elements are located in this directory. Components are X-referenced onto title blocks/fences.

Project Directory Structure - Consultants are not required to follow Airport Authority directory structure but are required to provide files that will fit into the Airport Authority file system as noted. Options are available to deal with AutoCAD xref file pathing as follows;

1) Placement of all drawings, plot sheets and xref files in one directory
2) When sub-directories are required, use Reference Type / Path Type set to Relative Path example: .\BLK\xxxxx.dwg Use a "." to indicate parent, then followed by the sub-directories as required.
3) AutoCAD command "eTransmit" with the selection to remove xref paths.

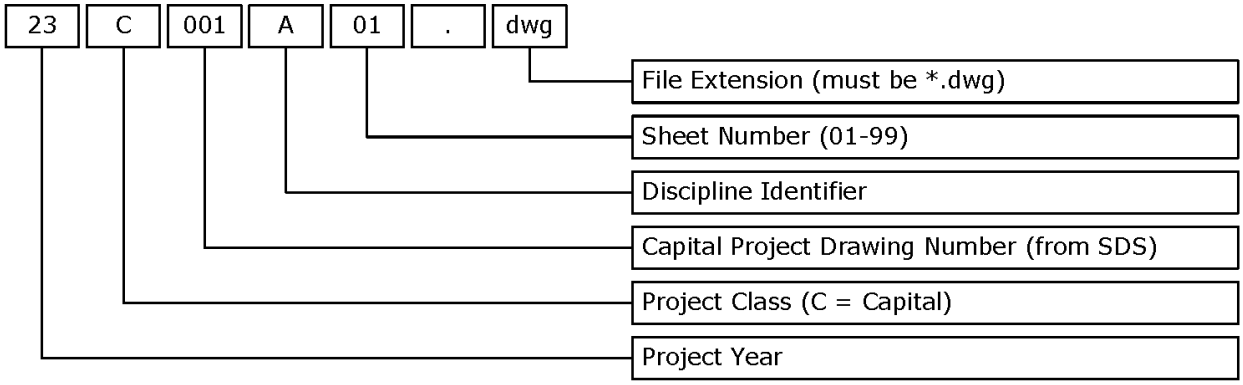
These above methods will allow the project drawings to move into the Airport Authority file System and allow AutoCAD to resolve the xref paths (see Section 5.3 External Reference Files).



3.2 File Naming Convention

File numbers are assigned for each separate Project tender package and are available from The Airport Authority Project Manager / Project Coordinator at the start of the project. The file number assigned is used to form part of the digital file number in combination with the sheet number. This is to ensure the digital drawing file numbering is unique from sheet to sheet also project to project.

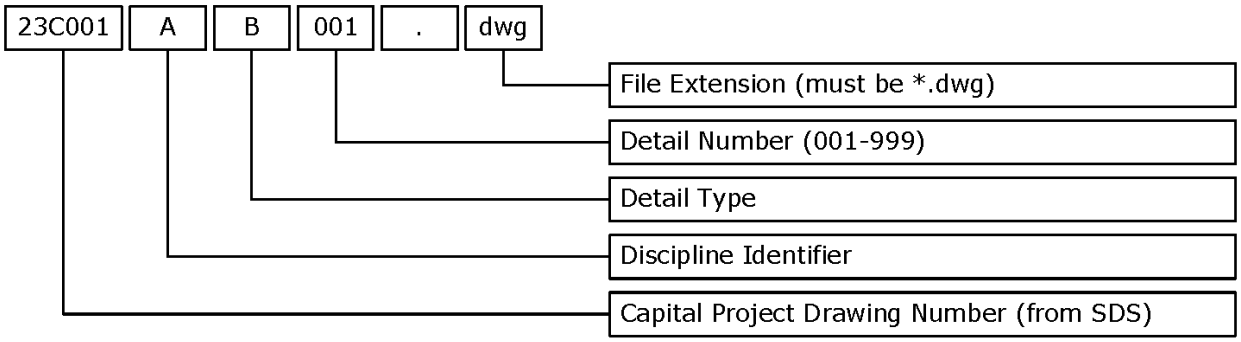
Plot Sheet Numbering



If multiple sheets are used within a single plot sheet, describe this in the digital file number. For example: 23C20a03-05.dwg would represent layout tabs a03, a04 and a05.

Additional characters may be added to the prefix to help relate to detail information types such as xref files (floor plans, ceiling plans elevations, or sections). The important item is using the prefix assigned to the project making the drawings unique for this project. These file to be located in .\BLK level.

Detail Numbering



Detail Type		Discipline Identifier	
B	*Floor plans*	A	*Architectural*
C	*Reflected Ceiling Plans*	C	*Civil*
D	*Details*	E	*Electrical*
E	*Elevations*	I	*Interiors*
F	*Finish Plans*	M	*Mechanical*
S	*Site Plans*	S	*Structural*
		T	*Telecom*

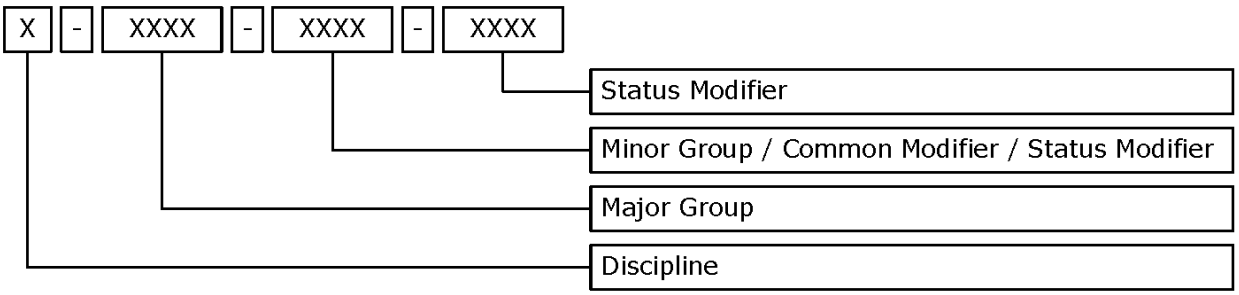
4.0 LAYERING

4.1 Layer Name Format

The layer convention used by the Airport Authority is based on the **AIA (American Institute of Architecture) Long Format Standard**. Variations to the AIA format are primarily Airport Specific layers. Layers are pre-built and are available for use by using Airport Authority template files. Only applicable layers are to be used. Blank layers are not to be included in final electronic data deliveries. Graphical representation of the same type of items shall be located on a single layer even when indicated on different drawings eg. a full height wall could be shown as **A-WALL** or **A-WALL-FULL** but not both. Layer names will be limited to 13 characters sub-divided into 4 sections, Disciplines, Major, Minor, Modifier and Status. Layer names are typically created using consonants which help in abbreviation creation. Maximum number of characters per group is 4. If new layers are required, they must first be approved by the Spatial Data Services prior to becoming part of official Airport Authority layering system. Complete layer lists with descriptions are required for each project is new layers have been used.

The Layer Guidelines are organized as a hierarchy. This accommodates expansion and user defined extensions to the layer list. Layer names are alphanumeric and use easy to remember abbreviations.

4.1.1 **Schematic**



4.1.2 **Discipline**

This field is used to indicate the origin of the graphic information. It may be a two-character field with the second characters either a hyphen or a user-defined modifier. This field uses that same format as the file names.

A	Architectural	**C**	Civil	**E**	Electrical
F	Fire Protection	**G**	General	**I**	Interior Design
L	Landscape	**M**	Mechanical	**P**	Plumbing
S	Structural	**T**	Telecom	**V**	Survey

4.1.3 Major Group

Major groups identify the specific discipline and building System.
Examples: A-DOOR for door, E-LITE for lights and P-FIXT plumbing fixture.

4.1.4 Minor Group

This is an optional, four-character field for further differentiation of the major group.
Example: A-WALL-PRHT indicates architecture, wall, and partial height.

4.1.5 Common Modifiers

The following are some common modifiers defined for use in the minor group field:

*-****-ABDN	Abandoned Features
*-****-ELEV	Elevation (vertical surfaces in 3D)
*-****-EQPM	Equipment
*-****-IDEN	Special Identification Tags (Inventory tags, Stair Numbers, etc)
*-****-PATT	Cross Hatching, Patterns
*-****-RMVD	Removed Features
*-****-SYMB	Symbols
*-****-TEXT	Text (Notes, Sizes, Labels, etc)

4.1.6 Status Modifiers

The status modifier may occur as a fourth field following the minor group or replace the minor group entirely. Typically used within construction drawings to denote the status of features and to help identify between new work, relocated items or items to be demolished. Status modifiers are not typically used within facility record drawings because those items are typically existing and do not require any status change but at times are used to identify features in question or feature needing record drawing status.

*-****-DEMO	Demolition
*-****-EXST	Existing to Remain
*-****-FUTR	Future Work
*-****-MOVE	Items to be Moved
*-****-NEWW	New Work
*-****-NICN	Not in Contract
*-****-NPLT	No Plot (No Plot option used with this layer)
*-****-PRPS	Proposed Work
*-****-RELO	Items to be Relocated
*-****-TEMP	Temporary Work

4.1.7 Annotation Layers

Annotation Layers are used for text, sheet borders, dimensions or cutting plane section symbols or other elements on a CADD drawing that do not represent physical

aspects of a building. The major group ANNO designates annotation.

Layer	Color	Linetype	Description
*-ANNO-CONS	8	Continuous	Construction Lines, Non-Plotting Info
*-ANNO-CTNN	13	Continuous	Continuation Notes (Model Space Only)
*-ANNO-DIMS	33	Continuous	Dimensions (Leaders, Angular, Linear, etc)
*-ANNO-KEYN	54	Continuous	Key Notes
*-ANNO-LEGN	43	Continuous	Legends
*-ANNO-NOTE	73	Continuous	Notes (Paragraph Format)
*-ANNO-REVS	113	Continuous	Revisions
*-ANNO-SCHD	23	Continuous	Schedule
*-ANNO-SYMB	52	Continuous	Symbols, Section Lines, Labels, Elevations
*-ANNO-TEXT	13	Continuous	Text (Single Line, Misc)
*-ANNO-TTLB	62	Continuous	Titleblocks

4.2 General Layer Comments

Viewports shall be placed on a VIEWPORT1, VIEWPORT2, VIEWPORT3, etc.. and set to "do not plot" in the layer menu. All other objects that are non-plot to be placed on a non-plot layer or layers.

It is recommended that each project make use of the AutoCAD Layer States Manager to help in save the layer states required to carry out the project work. To ensure your files are in a proper color layer on/off state ensure that you always save your file with a finished layer on / off color state so when the next user opens the file the drawing is in proper display condition.

If the following layering definitions do not suit the object being drawn, refer to Sub-Section 4.1 for proper layer creation and designation. Changes to the standards, symbology or layering groups may be considered upon formal request to SDS. The Airport Authority must approve these modifications in advance and the modifications shall be documented in writing with the drawing submission.

Layer lists are always under review and may change. It is advisable to check with The Airport Authority with each new project startup for an update to this document. The colors shown are used for plotting facility record drawings and may be used in different combinations for different projects as required.

4.3 Building Layers

4.3.1 **Architectural Layers**

LAYER	COLOR	LINETYPE	DESCRIPTION
A-AREA	123	Continuous	Area - Calculations & Boundary Lines
A-AREA-OCCP	203	Continuous	Area - Occupant Names
A-AREA-PATT	42	Continuous	Area - Hatch Patterns

LAYER	COLOR	LINETYPE	DESCRIPTION
A-AREA-TEXT	153	Continuous	Area - Descriptions and Identifiers
A-CLNG	21	Continuous	Ceiling Information
A-CLNG-ACCS	31	Continuous	Ceiling - Access
A-CLNG-BLKH	41	Continuous	Ceiling - Bulkheads
A-CLNG-GRID	41	Continuous	Ceiling - Grid
A-CLNG-OPEN	51	Continuous	Ceiling - Roof Penetrations
A-CLNG-PATT	41	Continuous	Ceiling - Hatch Patterns
A-CLNG-SUSP	61	Continuous	Ceiling - Suspended Elements
A-CLNG-TEES	71	Continuous	Ceiling - Main Tees
A-CNVR-CRSL	152	Continuous	Carousels
A-CNVR-CRSL-IDEN	163	Continuous	Carousel - Identifier Tags
A-CNVR-EDSU	52	Continuous	Conveyor - Explosion Detection System
A-CNVR-INBD	92	Continuous	Conveyor - Inbound
A-CNVR-OTBD	172	Continuous	Conveyor - Outbound
A-CNVR-SECT	12	Continuous	Conveyor - Security
A-CNVR-TRAN	32	Continuous	Conveyor - Transfer
A-DOOR	243	Continuous	Doors
A-DOOR-FULL	193	Continuous	Door - Full Height (to Ceiling): Swing and Leaf
A-DOOR-IDEN	153	Continuous	Door - Number, Hardware Group, Etc
A-DOOR-PRHT	202	Continuous	Door - Partial Height: Swing and Leaf
A-DOOR-SILL	241	Continuous	Door - Sills
A-DOOR-TEXT	153	Continuous	Door - Descriptions & Sizes
A-ELEV	132	Continuous	Elevation - Interior & Exterior
A-ELEV-IDEN	153	Continuous	Elevation - Component Identification Numbers
A-ELEV-OTLN	130	Dashed	Elevation - Interior & Exterior Outlines
A-ELEV-PATT	41	Continuous	Elevation - Textures and Hatch Patterns
A-ELEV-TEXT	153	Continuous	Elevation - Notes
A-EQPM	132	Continuous	Equipment
A-EQPM-ACCS	132	Continuous	Equipment - Access
A-EQPM-FIXD	142	Continuous	Equipment - Fixed
A-EQPM-GATE	122	Continuous	Equipment - Gate
A-EQPM-IDEN	153	Continuous	Equipment - Identifier Numbers & Labels
A-EQPM-MOVE	152	Continuous	Equipment - Moveable
A-EQPM-OVHD	31	Continuous	Equipment - Overhead
A-EQPM-PATT	41	Continuous	Equipment - Patterns & Hatching
A-EQPM-TEXT	153	Continuous	Equipment - Notes
A-ESKR	142	Continuous	Escalator
A-ESKR-IDEN	143	Continuous	Escalator - Identifier Tags
A-EVTR	202	Continuous	Elevator - Cars and Equipment

LAYER	COLOR	LINETYPE	DESCRIPTION
A-EVTR-IDEN	203	Continuous	Elevator - Identifier Tags
A-FLOR	152	Continuous	Floor Information
A-FLOR-HRAL	202	Continuous	Stair and Balcony Handrails, Guard Rails
A-FLOR-LEVL	52	Continuous	Level Changes, Ramps, Pits, Depressions
A-FLOR-MATS	121	Continuous	Floor Mats
A-FLOR-MILL	132	Continuous	Millwork (Manufactured & Field built Cabinets)
A-FLOR-OPEN	151	Continuous	Floor Openings
A-FLOR-OTLN	120	Phantom	Floor or Building Outline
A-FLOR-OVHD	31	Dashed	Overhead Items (Skylights, Overhangs-Dashed)
A-FLOR-PATT	41	Continuous	Paving, Tile, Carpet Patterns & Hatching
A-FLOR-RMNM	153	Continuous	Room Numbers (within database)
A-FLOR-SHFT	81	Continuous	Shaft Opening – Mechanical, Pipe Chase, etc.
A-FLOR-TEXT	153	Continuous	Details, Labels, Etc.
A-FURN	242	Continuous	Furniture (General)
A-FURN-GARB	42	Continuous	Furniture - Garbage Cans
A-FURN-IDEN	153	Continuous	Furniture - Identifier Tags
A-FURN-NEWS	122	Continuous	Furniture - News Stands
A-FURN-SEAT	142	Continuous	Furniture - Seats
A-FURN-SIGN	212	Continuous	Furniture - Signs
A-FURN-TOYS	242	Continuous	Furniture - Large Toys
A-FURN-TREE	82	Continuous	Furniture - Trees
A-FURN-VEND	52	Continuous	Furniture - Vending Machines
A-GLAZ	113	Continuous	Glazed Openings, Glazed Walls & Partitions
A-GLAZ-FULL	63	Continuous	Full Height Glazed Walls and Partitions
A-GLAZ-IDEN	153	Continuous	Window Numbers, Descriptions, and Identifiers
A-GLAZ-PATT	42	Continuous	Window Patterns & Hatching
A-GLAZ-PRHT	53	Continuous	Window and Partial Height Glazed Partitions
A-GLAZ-SILL	71	Continuous	Windowsills
A-ROOF	134	Continuous	Roof
A-ROOF-ELEV	143	Continuous	Roof - Surfaces 3D Views
A-ROOF-LEVL	171	Continuous	Roof - Level Changes; Ramps, Pits, Depressions
A-ROOF-OTLN	193	Continuous	Roof - Outline/Edge
A-ROOF-PATT	41	Continuous	Roof - Surface Patterns & Hatching
A-STRS	122	Continuous	Stair - Treads, Ladders
A-STRS-IDEN	123	Continuous	Stair - Identifier Tags
A-WALL	95	Continuous	Wall
A-WALL-FIRE	242	Continuous	Wall - Fire Wall Patterning
A-WALL-FULL	95	Continuous	Wall - Full Height, Stair & Shaft Walls, Walls to
A-WALL-HEAD	62	Continuous	Wall - Door & Window Headers (On Ceiling Plans)

LAYER	COLOR	LINETYPE	DESCRIPTION
A-WALL-JAMB	62	Continuous	Wall - Door& Window Jambs (Not On Ceiling Plans)
A-WALL-MOVE	113	Continuous	Wall - Moveable Partitions
A-WALL-PATT	42	Continuous	Wall - Insulation, Hatching and Fill
A-WALL-PRHT	112	Continuous	Wall - Part Height (Not On Ceiling Plans)
A-WALL-TPTN	102	Continuous	Wall - Toilet Partitions

4.3.2 **Structural Layers**

LAYER	COLOR	LINETYPE	DESCRIPTION
S-ABLT	202	Continuous	Anchor Bolts
S-ABLT-TEXT	153	Continuous	Anchor Bolt Tags, Identifiers & Notes
S-COLS	46	Continuous	Column
S-COLS-PATT	41	Continuous	Column - Patterns & Hatching
S-COLS-SILL	71	Continuous	Column - Sill (Structural Appearance)
S-COLS-TEXT	43	Continuous	Column - Notes & Sizes
S-FNDN	185	Continuous	Foundation
S-FNDN-PATT	41	Continuous	Foundation - Patterns & Hatching
S-FNDN-PILE	154	Continuous	Foundation - Piles, Drilled Piers
S-FNDN-RBAR	183	Continuous	Foundation - Reinforcing
S-FNDN-TEXT	153	Continuous	Foundation - Tags & Descriptions
S-FRAM-BEAM	21	Continuous	Framing - Beams
S-FRAM-DECK	52	Continuous	Framing - Structural Floor Deck
S-FRAM-JOIS	113	Continuous	Framing - Joists
S-FRAM-PATT	41	Continuous	Framing - Patterns & Hatching
S-FRAM-TEXT	153	Continuous	Framing - Notes & Sizes
S-GRID	250	B_Gridline	Column Grid
S-GRID-DIMS	33	Continuous	Column Grid - Dimensions & Text
S-GRID-IDEN	13	Continuous	Column Grid - Bubbles & Tags
S-METL	12	Continuous	Miscellaneous Metal
S-SLAB	53	Continuous	Slab
S-SLAB-EDGE	62	Continuous	Slab - Edge
S-SLAB-JOIN	12	Continuous	Slab - Control Joints
S-SLAB-PATT	41	Continuous	Slab - Patterns & Hatching
S-SLAB-RBAR	22	Continuous	Slab - Reinforcing
S-SLAB-TEXT	53	Continuous	Slab - Notes & Sizes
S-WALL	16	Continuous	Structural - Bearing or Shear Walls
S-WALL-BELW	71	Continuous	Structural - Wall Build out Below Grade Elevation
S-WALL-PATT	41	Continuous	Structural - Patterns & Hatching
S-WALL-PRHT	94	Continuous	Structural - Bearing Walls/ Partial Height
S-WALL-TEXT	13	Continuous	Structural - Wall Notes

4.3.3 **Mechanical Layers**

LAYER	COLOR	LINETYPE	DESCRIPTION
M-CHLD-EQPM	210	Continuous	Chilled Water - Equipment
M-CHLD-IDEN	133	Continuous	Chilled Water - Identifier Tags
M-CHLD-RETN-HIDD	140	Hidden	Chilled Water Return Pipe - Hidden
M-CHLD-RETN-PIPE	140	Dashed	Chilled Water Return Pipe
M-CHLD-RETN-SYMB	143	Continuous	Chilled Water Return Pipe - Symbols (Valves, Etc.)
M-CHLD-RETN-TEXT	133	Continuous	Chilled Water Return Pipe - Text (Pipe Sizes)
M-CHLD-SUPP-HIDD	140	Hidden	Chilled Water Supply Pipe - Hidden
M-CHLD-SUPP-PIPE	140	Continuous	Chilled Water Supply Pipe
M-CHLD-SUPP-SYMB	143	Continuous	Chilled Water Supply Pipe - Symbols (Valves, Etc.)
M-CHLD-SUPP-TEXT	133	Continuous	Chilled Water Supply Pipe - Text (Pipe Sizes)
M-CHLD-TEXT	133	Continuous	Chilled Water - Text (General Notes)
M-CONT-SYMB	73	Continuous	Control System - Symbols (Thermostats, Etc.)
M-CONT-TEXT	113	Continuous	Control System - Text
M-CONT-WIRE	102	Dashdot	Control System - Wire
M-GLYC-EQPM	210	Continuous	Glycol Cooling - Equipment
M-GLYC-IDEN	213	Continuous	Glycol Cooling - Identifier Tags
M-GLYC-RETN-HIDD	144	Hidden	Glycol Cooling Return Pipe - Hidden
M-GLYC-RETN-PIPE	144	Dashed	Glycol Cooling Return Pipe
M-GLYC-RETN-SYMB	163	Continuous	Glycol Cooling Return Pipe - Symbol (Valves, Etc.)
M-GLYC-RETN-TEXT	173	Continuous	Glycol Cooling Return Pipe - Text (Pipe Sizes)
M-GLYC-SUPP-HIDD	144	Hidden	Glycol Cooling Supply Pipe - Hidden
M-GLYC-SUPP-PIPE	144	Continuous	Glycol Cooling Supply Pipe
M-GLYC-SUPP-SYMB	163	Continuous	Glycol Cooling Supply Pipe - Symbol (Valves, Etc.)
M-GLYC-SUPP-TEXT	173	Continuous	Glycol Cooling Supply Pipe - Text (Pipe Sizes)
M-GLYC-TEXT	173	Continuous	Glycol Cooling - Text (Notes)
M-GLYH-EQPM	210	Continuous	Glycol Heating - Equipment
M-GLYH-IDEN	213	Continuous	Glycol Heating - Identifier Tags
M-GLYH-RETN-HIDD	220	Hidden	Glycol Heating Return Pipe - Hidden
M-GLYH-RETN-PIPE	220	Dashed	Glycol Heating Return Pipe
M-GLYH-RETN-SYMB	233	Continuous	Glycol Heating Return Pipe - Symbol (Valves, Etc.)
M-GLYH-RETN-TEXT	233	Continuous	Glycol Heating Return Pipe - Text (Pipe Sizes)
M-GLYH-SUPP-HIDD	220	Hidden	Glycol Heating Supply Pipe - Hidden
M-GLYH-SUPP-PIPE	220	Continuous	Glycol Heating Supply Pipe
M-GLYH-SUPP-SYMB	233	Continuous	Glycol Heating Supply Pipe - Symbol (Valves, Etc.)
M-GLYH-SUPP-TEXT	223	Continuous	Glycol Heating Supply Pipe - Text (Pipe Sizes)
M-GLYH-TEXT	223	Continuous	Glycol Heating - Text (Notes)
M-H200-EQPM	35	Continuous	200F Water Heating - Equipment

LAYER	COLOR	LINETYPE	DESCRIPTION
M-H200-IDEN	13	Continuous	200F Water Heating - Identifier Tags
M-H200-RETN-HIDD	10	Hidden	200F Water Heating Return Pipe - Hidden
M-H200-RETN-PIPE	10	Dashed	200F Water Heating Return Pipe
M-H200-RETN-SYMB	23	Continuous	200F Water Heating Return Pipe - Symbol (Valves)
M-H200-RETN-TEXT	13	Continuous	200F Water Heating Return Pipe - Text (Pipe Sizes)
M-H200-SUPP-HIDD	10	Hidden	200F Water Heating Supply Pipe - Hidden
M-H200-SUPP-PIPE	10	Continuous	200F Water Heating Supply Pipe
M-H200-SUPP-SYMB	23	Continuous	200F Water Heating Supply Pipe - Symbol (Valves)
M-H200-SUPP-TEXT	13	Continuous	200F Water Heating Supply Pipe - Text (Pipe Sizes)
M-H200-TEXT	13	Continuous	200F Water Heating - Text (General Notes)
M-H400-EQPM	210	Continuous	400F Water Heating - Equipment
M-H400-IDEN	223	Continuous	400F Water Heating - Identifier Tags
M-H400-RETN-HIDD	14	Hidden	400F Water Heating Return Pipe - Hidden
M-H400-RETN-PIPE	14	Dashed	400F Water Heating Return Pipe
M-H400-RETN-SYMB	243	Continuous	400F Water Heating Return Pipe - Symbol (Valves)
M-H400-RETN-TEXT	223	Continuous	400F Water Heating Return Pipe - Text (Pipe Sizes)
M-H400-SUPP-HIDD	14	Hidden	400F Water Heating Supply Pipe - Hidden
M-H400-SUPP-PIPE	14	Continuous	400F Water Heating Supply Pipe
M-H400-SUPP-SYMB	243	Continuous	400F Water Heating Supply Pipe - Symbol (Valves)
M-H400-SUPP-TEXT	223	Continuous	400F Water Heating Supply Pipe - Text (Pipe Sizes)
M-H400-TEXT	223	Continuous	400F Water Heating - Text (General Notes)
M-HEXH-DUCT	150	Continuous	Exhaust System - Ductwork
M-HEXH-EQPM	210	Continuous	Exhaust System - Equipment
M-HEXH-HIDD	140	Hidden	Exhaust System - Hidden
M-HEXH-IDEN	153	Continuous	Exhaust System - Identifier Tags (Diffuser Tags)
M-HEXH-PATT	131	Continuous	Exhaust System - Patterns and Hatching
M-HEXH-SYMB	143	Continuous	Exhaust System - Symbols (Exhaust Diffusers)
M-HEXH-TEXT	153	Continuous	Exhaust System - Text (Duct Sizes & Notes)
M-HRET-DUCT	104	Continuous	HVAC Return Ductwork
M-HRET-EQPM	210	Continuous	HVAC Return Ductwork - Equipment
M-HRET-HIDD	64	Hidden	HVAC Return Ductwork - Hidden
M-HRET-IDEN	103	Continuous	HVAC Return Ductwork - Identifier Tags (Diff. Tags)
M-HRET-PATT	41	Continuous	HVAC Return Ductwork - Patterns & Hatching
M-HRET-SYMB	73	Continuous	HVAC Return Ductwork - Symbols (Return Diffusers)
M-HRET-TEXT	103	Continuous	HVAC Return Ductwork - Text (Duct Sizes & Notes)
M-HSUP-DUCT	40	Continuous	HVAC Supply Ductwork
M-HSUP-EQPM	210	Continuous	HVAC Supply Ductwork - Equipment
M-HSUP-HIDD	40	Hidden	HVAC Supply Ductwork - Hidden
M-HSUP-IDEN	33	Continuous	HVAC Supply Ductwork – Identifier Tags (Diff. Tags)

LAYER	COLOR	LINETYPE	DESCRIPTION
M-HSUP-PATT	41	Continuous	HVAC Supply Ductwork - Patterns & Hatching
M-HSUP-SYMB	43	Continuous	HVAC Supply Ductwork - Symbols (Supply Diffusers)
M-HSUP-TEXT	33	Continuous	HVAC Supply Ductwork - Text (Duct Sizes & Notes)
M-RADW-EQPM	210	Continuous	Radiation Heating - Equipment
M-RADW-IDEN	233	Continuous	Radiation Heating - Identifier Tags
M-RADW-RETN-HIDD	30	Hidden	Radiation Heating - Return Hidden
M-RADW-RETN-PIPE	30	Dashed	Radiation Heating - Return Piping
M-RADW-RETN-SYMB	23	Continuous	Radiation Heating - Return Piping Symbols (Valves)
M-RADW-RETN-TEXT	33	Continuous	Radiation Heating - Return Piping Text (Pipe Sizes)
M-RADW-SUPP-HIDD	30	Hidden	Radiation Heating - Supply Hidden
M-RADW-SUPP-PIPE	30	Continuous	Radiation Heating - Supply Piping
M-RADW-SUPP-SYMB	23	Continuous	Radiation Heating - Supply Piping Symbols (Valves)
M-RADW-SUPP-TEXT	33	Continuous	Radiation Heating - Supply Piping Text (Pipe Sizes)
M-RADW-SYMB	23	Continuous	Radiation Heating - Symbols
M-REFG-EQPM	210	Continuous	Refrigeration - Equipment
M-REFG-HIDD	204	Hidden	Refrigeration - Hidden
M-REFG-IDEN	193	Continuous	Refrigeration - Identifier Tags
M-REFG-PIPE	204	Continuous	Refrigeration - Piping
M-REFG-SYMB	213	Continuous	Refrigeration - Symbols (Valves, Etc.)
M-REFG-TEXT	193	Continuous	Refrigeration - Text (Pipe Sizes & Notes)
M-STEM-CONP	54	Continuous	Steam System - Condensate Piping
M-STEM-EQPM	210	Continuous	Steam System - Equipment
M-STEM-HIDD	110	Hidden	Steam System - Hidden
M-STEM-PIPE	110	Continuous	Steam System – Piping
M-STEM-SYMB	123	Continuous	Steam System – Symbols
M-STEM-TEXT	113	Continuous	Steam System – Text

4.3.4 Plumbing Layers

LAYER	COLOR	LINETYPE	DESCRIPTION
P-CMPA-EQPM	210	Continuous	Compressed Air - Equipment
P-CMPA-PIPE	220	Continuous	Compressed Air - Pipe
P-CMPA-SYMB	203	Continuous	Compressed Air - Symbols (Valves, etc.)
P-CMPA-TEXT	213	Continuous	Compressed Air - Text
P-DOMW-CPIP	134	B_cwl	Domestic Cold Water - Piping
P-DOMW-CPIP-SYMB	123	Continuous	Domestic Cold Water Piping - Symbols (Valves)
P-DOMW-CPIP-TEXT	133	Continuous	Domestic Cold Water Piping - Text (Pipe Sizes/Notes)
P-DOMW-EQPM	210	Continuous	Domestic Water - Equipment (Pumps)
P-DOMW-HPIP	14	B_hwl	Domestic Hot Water - Piping
P-DOMW-HPIP-SYMB	23	Continuous	Domestic Hot Water Piping - Symbols (Valves)

P-DOMW-HPIP-TEXT	13	Continuous	Domestic Hot Water Piping - Text (Pipe Sizes/Notes)
P-DOMW-HREC	30	B_hwr	Domestic Hot Water Recirculation - Piping
P-DOMW-HREC-SYMB	13	Continuous	Domestic Hot Water Recirculation - Symbols (Valves)
P-DOMW-HREC-TEXT	33	Continuous	Domestic Hot Water Recirculation - Text (Pipe Sizes
P-FUEL-EQPM	210	Continuous	Fuel/Oil - Equipment
P-FUEL-IDEN	183	Continuous	Fuel/Oil - Identifiers
P-FUEL-PIPE	194	Dashed	Fuel/Oil - Piping
P-FUEL-SYMB	193	Continuous	Fuel/Oil - Symbols (Valves, etc.)
P-FUEL-TEXT	173	Continuous	Fuel/Oil - Text (General Notes)
P-NGAS-EQPM	210	Continuous	Natural Gas - Equipment
P-NGAS-HIHP	114	B_ngas	Natural Gas High Pressure Piping
P-NGAS-HIHP-SYMB	103	Continuous	Natural Gas High Pressure Piping - Symbols (Valves)
P-NGAS-HIHP-TEXT	93	Continuous	Natural Gas High Pressure Piping - Text (pipe sizes)
P-NGAS-LOWP	110	Continuous	Natural Gas Low Pressure Piping
P-NGAS-LOWP-SYMB	123	Continuous	Natural Gas Low Pressure Piping - Symbols (Valves)
P-NGAS-LOWP-TEXT	113	Continuous	Natural Gas Low Pressure Piping - Text (Pipe Sizes)
P-NGAS-MEDP	70	B_ngas	Natural Gas Medium Pressure Piping
P-NGAS-MEDP-SYMB	73	Continuous	Natural Gas Medium Pressure Piping - Symbols
P-NGAS-MEDP-TEXT	83	Continuous	Natural Gas Medium Pressure Piping - Text (Pipe
P-SANR-EQPM	210	Continuous	Sanitary - Equipment
P-SANR-FIXT	61	Continuous	Sanitary - Fixtures
P-SANR-PIPE	40	Dashed	Sanitary - Piping
P-SANR-SYMB	43	Continuous	Sanitary - Symbols
P-SANR-TEXT	53	Continuous	Sanitary - Text
P-STRM-EQPM	210	Continuous	Storm - Equipment
P-STRM-PIPE	154	Dashed	Storm - Piping
P-STRM-SYMB	143	Continuous	Storm - Symbols
P-STRM-TEXT	153	Continuous	Storm - Text
P-VENT-PIPE	214	Continuous	Ventilation - Piping
P-VENT-SYMB	213	Continuous	Ventilation - Symbols
P-VENT-TEXT	193	Continuous	Ventilation – Text

4.3.5 **Electrical Layers**

LAYER	COLOR	LINETYPE	DESCRIPTION
E-CTRL-DEVC	52	Continuous	Control System - Devices
E-CTRL-ECT	54	Continuous	Control System - Electronics
E-CTRL-WIRE	61	Continuous	Control System - Wiring
E-EQPM	62	Continuous	Electrical Equipment
E-EQPM-FIXD	142	Continuous	Electrical Equipment - Fixed
E-FIRE-CNDT	232	Continuous	Fire Systems - Conduit

LAYER	COLOR	LINETYPE	DESCRIPTION
E-FIRE-IDEN	233	Continuous	Fire Systems - Identifier Tags
E-FIRE-SYMB	233	Continuous	Fire Systems - Symbols (Alarms, Extinguishers)
E-FIRE-TEXT	233	Continuous	Fire Systems - General Notes
E-GRND-CIRC	123	Continuous	Electrical Ground System - Circuits
E-GRND-CNDT	112	Continuous	Electrical Ground System - Conduit
E-GRND-DIAG	114	Continuous	Electrical Ground System - Diagram
E-GRND-EQPM	131	Continuous	Electrical Ground System - Equipment
E-GRND-IDEN	153	Continuous	Electrical Ground System - Identifier Tags
E-GRND-REFR	141	Continuous	Electrical Ground System - Reference
E-GRND-TEXT	153	Continuous	Electrical Ground System - Text
E-LITE-CIRC	193	Continuous	Lighting - Circuits
E-LITE-CNDT	192	Dashed	Lighting - Conduit
E-LITE-EMER	134	Continuous	Lighting - Emergency Lighting Symbols
E-LITE-EXIT	234	Continuous	Lighting - Exit Lighting Symbols
E-LITE-IDEN	193	Continuous	Lighting - Luminaries Descriptions & Identifier Tags
E-LITE-JBOX	192	Continuous	Lighting - Junction Box
E-LITE-PANL	193	Continuous	Lighting - Panels
E-LITE-SWCH	192	Continuous	Lighting - Circuit Switches
E-LITE-SYMB	194	Continuous	Lighting - Symbols
E-LITE-TEXT	193	Continuous	Lighting - General Notes
E-LITE-WCNT	153	Continuous	Lighting - Circuit Wire Counts
E-POWR-BUSW	22	Continuous	Power - Busways
E-POWR-CIRC	23	Continuous	Power - Circuit Identifiers
E-POWR-CNDT	23	Dashed	Power - Conduit
E-POWR-DBNK	33	Dashed	Power - Ductbanks
E-POWR-EQPM	13	Continuous	Power - Equipment
E-POWR-FEED	12	Continuous	Power - Circuit Feeders
E-POWR-HTRC	190	Continuous	Power - Heat Tracing Circuits
E-POWR-JBOX	43	Continuous	Power - Junction Box
E-POWR-LTNG	181	Continuous	Power - Lightning Protection System
E-POWR-PANL	34	Continuous	Power - Panels
E-POWR-PATT	41	Continuous	Power - Patterns & Hatching
E-POWR-SYMB	42	Continuous	Power - Symbols
E-POWR-TEXT	133	Continuous	Power - Text
E-POWR-UCPT	11	Dashed	Power - Under Carpet Circuits
E-POWR-URAC	152	Dashed	Power - Under Floor Raceways
E-POWR-WCNT	133	Continuous	Power - Circuit Wire Counts
E-SIGN	134	Continuous	Signage
E-SIGN-IDEN	153	Continuous	Signage - Identifier Tags

LAYER	COLOR	LINETYPE	DESCRIPTION
E-SIGN-PATT	151	Continuous	Signage - Patterns & Hatching
E-SIGN-TEXT	153	Continuous	Signage – Text

4.3.6 Telecom Layers

LAYER	COLOR	LINETYPE	DESCRIPTION
T-ALRM-CNDT	134	Continuous	Alarm System - Conduit
T-ALRM-EQPM	133	Continuous	Alarm System - Equipment
T-ALRM-SYMB	133	Continuous	Alarm System - Symbols
T-ALRM-TEXT	133	Continuous	Alarm System - Text
T-CATV-CNDT	144	Continuous	Shaw Cablevision - Conduit
T-CATV-EQPM	143	Continuous	Shaw Cablevision - Equipment
T-CATV-SYMB	143	Continuous	Shaw Cablevision - Symbols
T-CATV-TEXT	143	Continuous	Shaw Cablevision - Text
T-CLOK-CNDT	74	Continuous	Clock - Conduit
T-CLOK-EQPM	73	Continuous	Clock - Equipment
T-CLOK-SYMB	73	Continuous	Clock - Symbols
T-CLOK-TEXT	73	Continuous	Clock - Text
T-CSEC-CNDT	144	Continuous	Close Circuit Television - Conduit
T-CSEC-EQPM	143	Continuous	Close Circuit Television - Equipment
T-CSEC-IDEN	143	Continuous	Close Circuit Television - Identifier Tags
T-CSEC-SYMB	143	Continuous	Close Circuit Television - Symbols
T-CSEC-TEXT	143	Continuous	Close Circuit Television - Text
T-FIDS-CNDT	204	Continuous	Flight Information Display System - Conduit
T-FIDS-EQPM	203	Continuous	Flight Information Display System - Equipment
T-FIDS-SYMB	203	Continuous	Flight Information Display System - Symbols
T-FIDS-TEXT	203	Continuous	Flight Information Display System - Text
T-SOUN-CNDT	104	Dashed	Paging and Sound System - Conduit
T-SOUN-EQPM	103	Continuous	Paging and Sound System - Equipment
T-SOUN-IDEN	103	Continuous	Paging and Sound System – Identifier Tags
T-SOUN-SYMB	103	Continuous	Paging and Sound System - Symbols
T-SOUN-TEXT	103	Continuous	Paging and Sound System - Text
T-TELE-CNDT	204	Continuous	Telecommunication and Data System - Conduit
T-TELE-EQPM	203	Continuous	Telecommunication and Data System - Equipment
T-TELE-SYMB	203	Continuous	Telecommunication and Data System - Symbols
T-TELE-TEXT	203	Continuous	Telecommunication and Data System - Text
T-TRAY	154	Continuous	Cable Tray
T-TRAY-EQPM	153	Continuous	Cable Tray - Equipment
T-TRAY-PATT	151	Continuous	Cable Tray - Patterns & Hatching
T-TRAY-SYMB	153	Continuous	Cable Tray - Symbols

LAYER	COLOR	LINETYPE	DESCRIPTION
T-TRAY-TEXT	153	Continuous	Cable Tray – Text

4.3.7 Fire Protection

LAYER	COLOR	LINETYPE	DESCRIPTION
F-PROT-EQPM	210	Continuous	Fire Protection - Equipment (Fire Hose Cabinets,
F-PROT-IDEN	163	Continuous	Fire Protection - Identifiers
F-PROT-PATT	191	Continuous	Fire Protection - Patterns & Hatching
F-PROT-PIPE	150	Continuous	Fire Protection - Piping
F-PROT-SYMB	153	Continuous	Fire Protection - Symbols
F-PROT-TEXT	143	Continuous	Fire Protection - Text (Pipe Sizes & General
F-SPRN-HEAD	52	Continuous	Sprinkler - Heads (Sprinkler Head Symbols)
F-SPRN-PIPE	190	Continuous	Sprinkler - Piping
F-SPRN-SYMB	193	Continuous	Sprinkler – Symbols (Valves)
F-SPRN-TEXT	143	Continuous	Sprinkler - Text (Pipe Sizes & General Notes)

4.4 Civil Layers

4.4.1 Base Layers

LAYER	COLOR	LINETYPE	DESCRIPTION
C-APRN	74	Continuous	Apron - Aircraft Maneuvering Surfaces
C-APRN-FENC	133	Continuous	Apron – Blast Fence
C-APRN-SHLD	192	Continuous	Apron - Shoulder
C-APRN-STRP	72	S_Centre	Apron - Paint Lines (Striping)
C-APRN-STRP-EQPM	72	Continuous	Apron - Equipment Restriction Paint Lines
C-APRN-STRP-GTTX	163	Continuous	Apron - Gate Number Painted
C-APRN-STRP-IDEN	72	Continuous	Apron - Identifiers
C-APRN-STRP-INLN	163	Continuous	Apron - Lead-in Gate Paint Lines
C-APRN-STRP-SBAR	163	Continuous	Apron – Stop Bar
C-APRN-STRP-SBAR-IDEN	163	Continuous	Apron – Stop Bar Identifiers
C-APRN-STRP-SBAR-IDEN	72	Continuous	Apron - Nose Wheel Markers & Paint Labels
C-APRN-STRP-VSRP	72	Continuous	Apron - Aircraft Service Road Paint Lines
C-APRN-STRP-VSRP-CNTR	72	Continuous	Apron - Aircraft Service Road Paint Centre Lines
C-APRN-STRP-WALK	71	Continuous	Apron - Walkways
C-APRN-TEXT	72	Continuous	Apron - Text
C-BERM	19	Continuous	Berms & Berm Patterns
C-BIKE-PATH	171	Continuous	Bike Pathways
C-BIKE-PATH-TEXT	172	Continuous	Bike Pathways - Text

LAYER	COLOR	LINETYPE	DESCRIPTION
C-BLDG	204	Continuous	Building - Footprint & Structures on Airport Property
C-BLDG-BRDG	202	Continuous	Building – Aircraft Loading Bridge
C-BLDG-NUMB	18	Continuous	Building - Numbers
C-BLDG-PATT	8	Continuous	Building - Footprint Hatch
C-BLDG-TEXT	202	Continuous	Building - Text
C-BLDG-TOPO-TEXT	18	Continuous	Building Roof Elevation
C-BLDG-UNGD	8	Hidden2	Building - Underground
C-FENC	32	S_Fence	Fence - Barbed Wire Fencing
C-FENC-SERT	32	S_Sfence	Fence - Security
C-FENC-SERT-TEXT	42	Continuous	Fence – Security Labels & Text
C-FENC-TEXT	42	Continuous	Fence - Labels & Text
C-GEOD-FOTO	7	Continuous	Orthophoto (Raster Images)
C-GEOD-IDEN	192	Continuous	Survey Control Monument Identifier Tags
C-GEOD-SYMB	193	Continuous	Survey Control Benchmark, Square/Round Iron Bar
C-GEOD-SYMB-APRN	193	Continuous	Survey Control Benchmark, Square/Round Iron Bar – Lean in Lines
C-GRID-IDEN	162	Continuous	Site Grid Lines - Identifier Tags
C-GRID-MAJR	133	Continuous	Site Grid Lines
C-GRID-MINR	202	Dashed	Site Grid Lines - Minor Intervals
C-PKNG	200	Continuous	Parking Lots on Airport Property
C-PKNG-CURB	203	Continuous	Parking Lot - Curbs & Islands
C-PKNG-STRP	202	Continuous	Parking Lot - Paint Lines, Handicap Symbols
C-PKNG-TEXT	202	Continuous	Parking Lot - Text
C-RAIL	32	PhantomX2	Railroads
C-RAIL-TEXT	42	Continuous	Railroads - Text
C-RNWY	234	Continuous	Runway - Aircraft Maneuvering Surfaces
C-RNWY-ABDN	62	S-ABDN	Runway – Abandoned
C-RNWY-IDEN	232	Continuous	Runway – Identifier Tags
C-RNWY-NUMB	233	Continuous	Runway - Numbers
C-RNWY-SHLD	192	Continuous	Runway - Shoulder
C-RNWY-STRP	232	S_Centre	Runway - Paint Lines (Striping)
C-RNWY-TEXT	232	Continuous	Runway - Notes & Labels
C-ROAD-ARVL	232	Continuous	Roads – Arrivals
C-ROAD-ARVL-STRP	231	S_Cenre	Roads – Arrivals Paint Lines
C-ROAD-ARVL-WALK	142	Continuous	Roads – Arrivals Walkways
C-ROAD-DPTR	232	Continuous	Roads – Departures
C-ROAD-DPTR-STRP	231	S_Cenre	Roads – Departures Paint Lines
C-ROAD-DPTR-WALK	142	Continuous	Roads – Departures Walkways
C-ROAD-MAJR	174	Continuous	Roads - Highways, Major Roads, Collector Roads
C-ROAD-MAJR-TEXT	172	Continuous	Roads – Major Text

LAYER	COLOR	LINETYPE	DESCRIPTION
C-ROAD-MINR	170	Continuous	Roads - Minor Roads
C-ROAD-MINR-TEXT	172	Continuous	Roads – Minor Text
C-ROAD-STRP	172	Continuous	Roads - Paint Lines (Striping)
C-ROAD-TUNL	171	Dashed	Roads - Tunnel
C-SIGN	203	Continuous	Sign
C-SIGN-TEXT	202	Continuous	Signs – Text
C-SURF-EDGE	192	Continuous	Surface – Surface Edges (Apron, Taxi, Rnwy)
C-SURF-RECT	192	Continuous	Recreational - Surfaces
C-SURF-RECT-TEXT	192	Continuous	Recreational - Text
C-SURF-TEXT	192	Continuous	Surface Text Labels (Concrete, Grass, Asphalt, Gravel)
C-TAXI	124	Continuous	Taxiway - Aircraft Maneuvering Surfaces
C-TAXI-SHLD	192	Continuous	Taxiway – Shoulder
C-TAXI-STRP	122	S_Centre	Taxiway - Paint Lines (Striping)
C-TAXI-TEXT	122	Continuous	Taxiway – Text
C-WALK	142	Continuous	Walks and Steps
C-WALK-STRP	132	Continuous	Walks and Steps - Pedestrian Paint Lines
C-WALK-TEXT	132	Continuous	Walks and Steps - Text
C-WATR-NTRL	144	Continuous	Water – Natural
C-WATR-NTRL-TEXT	142	Continuous	Water – Natural Text

4.4.2 **Utilities**

LAYER	COLOR	LINETYPE	DESCRIPTION
C-FUEL	60	S_Fuel	Fuel - Storage, Pump Stations, Manholes, Facilities
C-FUEL-EQPM	60	Continuous	Fuel - Equipment
C-FUEL-IDEN	62	Continuous	Fuel – Identifier Tags
C-FUEL-SYMB	63	Continuous	Fuel - Symbols
C-FUEL-TEXT	62	Continuous	Fuel - Labels, Pipe Size & Type
C-GLYC	210	Continuous	Glycol - Facilities
C-GLYC-EQPM	213	Continuous	Glycol - Equipment
C-GLYC-SYMB	213	Continuous	Glycol - Symbols
C-GLYC-TEXT	212	Continuous	Glycol - Labels, Pipe Size & Type
C-NGAS	40	S_Ngas	Natural - Gas Facilities
C-NGAS-EQPM	43	Continuous	Natural Gas – Equipment
C-NGAS-IDEN	42	Continuous	Natural Gas - Identifier Tags
C-NGAS-SYMB	43	Continuous	Natural Gas - Symbols
C-NGAS-TEXT	42	Continuous	Natural Gas - Labels, Pipe Size
C-SSWR	100	S_San	Sanitary Sewer - Features
C-SSWR-IDEN	102	Continuous	Sanitary Sewer - Identifier Tags
C-SSWR-NVRT	102	Continuous	Sanitary Sewer - Invert Information

LAYER	COLOR	LINETYPE	DESCRIPTION
C-SSWR-SYMB	103	Continuous	Sanitary Sewer - Symbols, Manholes, Valves, Meters
C-SSWR-TEXT	102	Continuous	Sanitary Sewer - Labels, Sizes, Types, Flow Direction
C-WATR	140	S_Water	Water - Domestic Water Facilities
C-WATR-IDEN	142	Continuous	Water - Identifier Tags (Valves, Hydrants)
C-WATR-SYMB	143	Continuous	Water - Symbols, Valves, Pumps, Tanks, Meters
C-WATR-TEXT	142	Continuous	Water - Labels, Pipe Size & Type

4.4.3 Storm Drainage

LAYER	COLOR	LINETYPE	DESCRIPTION
C-STRM	120	S_Storm	Storm Drainage - Features
C-STRM-DTCH	122	S_Ditch	Storm Drainage - Ditches & Drainage
C-STRM-IDEN	122	Continuous	Storm Drainage - Identifier Tags
C-STRM-NVRT	122	Continuous	Storm Drainage - Piping Invert Elevations
C-STRM-POND	124	Continuous	Storm Pond Edge
C-STRM-POND-AERN	120	S_AAS	Storm Pond Aeration
C-STRM-SUBD	120	S_Storm	Storm Drainage - Subdrains
C-STRM-SYMB	123	Continuous	Storm Drainage - Symbols, Manhole & Catch Basins
C-STRM-TEXT	122	Continuous	Storm Drainage - Labels, Sizes, Types, Flow Direction

4.4.4 Surface Topography

LAYER	COLOR	LINETYPE	DESCRIPTION
C-TOPO-BORE	63	Continuous	Topo - Test bore holes
C-TOPO-MAJR	190	Continuous	Topo - Ground Contours - Major Interval
C-TOPO-MINR	222	Continuous	Topo - Ground Contours - Minor Interval
C-TOPO-MJTX	221	Continuous	Topo - Ground Contours - Major Interval – Elev.
C-TOPO-MNTX	221	Continuous	Topo - Ground Contours - Minor Interval – Elev.
C-TOPO-PATT	255	Continuous	Topo – Building Outline Hatch
C-TOPO-SPOT	200	Continuous	Topo - Spot Height Labels

4.4.5 Power

LAYER	COLOR	LINETYPE	DESCRIPTION
C-DUCT	80	Continuous	Duct Bank
C-DUCT-SYMB	83	Continuous	Duct Bank– Symbols
C-DUCT-TEXT	82	Continuous	Duct Bank – Text
C-LITE	32	Continuous	Lighting - Site / Street Lighting
C-LITE-IDEN	32	Continuous	Lighting - Identifier Tags (Runway, Street, Etc.)
C-LITE-SYMB	33	Continuous	Lighting - Runway Lights, Flood Lights, Etc.

LAYER	COLOR	LINETYPE	DESCRIPTION
C-LITE-TEXT	32	Continuous	Lighting – Text
C-POWR	10	S_Power	Power - Electrical Power Feeds & Distribution Lines
C-POWR-1000	12	S_Power	Power - Terminal Area (Scaled Up)
C-POWR-DUCT	12	S_Duct	Power - Ducts Underground (With Text)
C-POWR-IDEN	12	Continuous	Power - Identifier Tags (Transformers, Etc.)
C-POWR-IDEN-1000	12	Continuous	Power - Terminal Area (Scaled up)
C-POWR-OVHD	11	Continuous	Power - Overhead Power Lines
C-POWR-POLE	13	Continuous	Power – Poles
C-POWR-SYMB	13	Continuous	Power - Symbols, Transformers, Pull Boxes, Etc.
C-POWR-SYMB-1000	12	Continuous	Power - Terminal Area (Scaled Up)
C-POWR-TEXT	12	Continuous	Power - Line Sizes, Notes, Labels, Etc.
C-POWR-TEXT-1000	12	Continuous	Power - Terminal Area (Scaled Up)

4.4.6 **Telecom**

LAYER	COLOR	LINETYPE	DESCRIPTION
C-COM1	200	S_Comm1	Comm - Airport Auth. System
C-COM1-SYMB	203	Continuous	Comm - Airport Auth. System Symbols
C-COM1-TEXT	202	Continuous	Comm – Airport Auth System Text
C-COM2	210	S_Comm2	Comm - Nav Aid Specific
C-COM2-SYMB	213	Continuous	Comm - Nav Aid Specific Symbols
C-COM2-TEXT	212	Continuous	Comm - Nav Aid Specific Text
C-COM3	220	S_Comm3	Comm – Outside/Private Lines (Telus, Shaw, Other)
C-COM3-SYMB	223	Continuous	Comm – Outside/Private Symbols
C-COM3-TEXT	222	Continuous	Comm – Outside/Private Text
C-COM4	230	S_Comm4	Comm - Other Lines Not Specified Above
C-COM4-SYMB	233	Continuous	Comm - Other Lines Not Specified Symbols
C-COM4-TEXT	232	Continuous	Comm - Other Lines Not Specified Text
C-COMM-DUCT	83	S_Duct	Comm - Ducts & Text
C-COMM-FIBRE	80	S_Comm1	Comm – Authority Fibre
C-COMM-IDEN	82	Continuous	Comm - Identifier Tags
C-DUCT	80	Continuous	Duct Bank
C-DUCT-SYMB	83	Continuous	Duct Bank– Symbols
C-DUCT-TEXT	82	Continuous	Duct Bank – Text

4.4.7 **Landscaping**

LAYER	COLOR	LINETYPE	DESCRIPTION
L-IRRG	140	Continuous	Irrigation System
L-IRRG-COVR	140	Continuous	Irrigation - Coverage Area

LAYER	COLOR	LINETYPE	DESCRIPTION
L-IRRG-EQPM	140	Continuous	Irrigation - Equipment
L-IRRG-PIPE	140	Continuous	Irrigation - Piping
L-IRRG-TEXT	152	Continuous	Irrigation - Notes & Information
L-PLNT	60	Continuous	Plant and Landscape Materials
L-PLNT-BEDS	161	Continuous	Plants - Rock, Bark, and Other Landscaping Beds
L-PLNT-GRND	102	Continuous	Plants - Grounds Covers and Vines
L-PLNT-PLAN	53	Continuous	Plants - Bedding Plants (Flowers)
L-PLNT-TREE	33	Continuous	Plants - Trees and Shrubs
L-PLNT-TURF	80	Continuous	Plants - Lawn Areas

4.4.8 **Lease**

LAYER	COLOR	LINETYPE	DESCRIPTION
C-FUEL-ESMT1	144	Continuous	Fuel Facility Easement
C-FUEL-ESMT1-IDEN	142	Continuous	Fuel Facility Easement Identifier Tags & Text
C-FUEL-ESMT2	164	Continuous	Fuel Facility Easement
C-FUEL-ESMT2-IDEN	162	Continuous	Fuel Facility Easement Identifier Tags & Text
C-PROP	16	Continuous	Property Boundary - Lines, Survey Benchmarks
C-PROP-BRNG	56	Continuous	Property Boundary - Bearings Labels
C-PROP-ESMT	173	Dashed2	Easements, Right of Ways
C-PROP-ESMT-IDEN	172	Continuous	Easements Identifier Tags & Text
C-PROP-ESMT-PINS	172	Dashed2	Easement Pins
C-PROP-EXST-BRNG	12	Continuous	Leased Parcel Bearing
C-PROP-EXST-IDEN	12	Continuous	Leased Parcel Identifier Tags
C-PROP-EXST-LINE	14	Continuous	Leased Parcel Line
C-PROP-EXST-PINS	12	Continuous	Leased Parcel Pins
C-PROP-EXST-TEXT	12	Continuous	Leased Parcel Text
C-PROP-PNTS	72	Continuous	Property Boundary Points
C-PROP-PRPS-BRNG	92	Continuous	Proposed Parcel Bearing
C-PROP-PRPS-ESMT	83	Dashed2	Proposed Easements, Right of Ways
C-PROP-PRPS-ESMT-IDEN	82	Continuous	Proposed Easements - Identifier Tags & Text
C-PROP-PRPS-IDEN	92	Continuous	Proposed Parcel Identifier Tags
C-PROP-PRPS-LINE	94	Continuous	Proposed Parcel Line
C-PROP-PRPS-PINS	92	Continuous	Proposed Parcel Pins
C-PROP-TEXT	12	Continuous	Property Boundary – Notes
C-PROP-THCK	253	Continuous	Property Boundary – Thick

4.4.9 **Off Property**

LAYER	COLOR	LINETYPE	DESCRIPTION
C-OFPR-BIKE-PATH	18	Continuous	Off Property - Bike Path
C-OFPR-BLDG	18	Continuous	Off Property - Buildings
C-OFPR-BLDG-PATT	18	Continuous	Off Property - Buildings Hatch
C-OFPR-BLDG-TOPO-TEXT	18	Continuous	Off Property – Building Roof Elevation
C-OFPR-COMM	18	Continuous	Off Property - Communication Data
C-OFPR-FENC	18	S_Fence	Off Property - Fences
C-OFPR-FUEL	18	S_Fuel	Off Property – Fuel Lines & Data
C-OFPR-LITE	18	Continuous	Off Property - Light Symbols & Data
C-OFPR-NGAS	18	S_Ngas	Off Property - Natural Gas Lines & Data
C-OFPR-NGAS-TEXT	18	Continuous	Off Property – Natural Gas Identifiers & Labels
C-OFPR-PKNG	18	Continuous	Off Property - Parking
C-OFPR-POWR	18	Continuous	Off Property - Power Lines & Symbols
C-OFPR-POWR-TEXT	18	Continuous	Off Property – Power Identifiers & Labels
C-OFPR-ROAD-MINR	18	Continuous	Off Property – Minor Roads & Curbs
C-OFPR-ROAD-TEXT	18	Continuous	Off Property – Road Identifiers & Labels
C-OFPR-SSWR	18	S_San	Off Property - Sanitary Sewer Lines & Data
C-OFPR-SSWR-TEXT	18	Continuous	Off Property – Sanitary Identifiers & Labels
C-OFPR-STRM	18	S_Storm	Off Property – Storm Drainage
C-OFPR-STRM-TEXT	18	Continuous	Off Property – Storm Identifiers & Labels
C-OFPR-TOPO-PATT	255	Continuous	Off Property - Topo Building Outline Hatch
C-OFPR-WATR	18	S_Water	Off Property - Water Lines & Data
C-OFPR-WATR-NTRL	18	Continuous	Off Property - Natural
C-OFPR-WATR-TEXT	18	Continuous	Off Property – Water Identifiers & Labels

4.5 YYC Only Layers

LAYER	COLOR	LINETYPE	DESCRIPTION
TT-APRN-STRP-GTTX-OLD	163	Continuous	Apron – Old Numbering System
TT-PROJ-BNDY	7	Dashed	Project Boundaries Reference
TT-PROJ-PRNM	113	Continuous	Project Number Reference
TT-SITE-10K-TEXT	40	Continuous	Site Text – 1-10K Plot
TT-SITE-35K-TEXT	40	Continuous	Site Text – 1-35K Plot
TT-FLOR-RMNM-OLDN	192	Continuous	Room Numbers - Old (original building or past space)

5.0 DRAWING REQUIREMENTS

5.1 Model and Paper Space

A model describes a portion of a building's geometry, its physical components: walls, doors, windows, columns, beams, outlets, ducts, etc. A model has no scale; it is drawn life-size. All buildings are described by a series of two-dimensional models - plans, elevations, sections, and details - although the organizational concept also supports three-dimensional. Models can be constructed using a hierarchically, in other words, models can contain other models.

Paper Space Layout Tab contains one or more scaled viewports of one or more models arranged within a border or title block. These tabs represent one - and only one - plotted drawing. Tabs are always plotted at full scale (1=1), and the origin shall be at the lower left-hand 0,0,0 corner of the sheet border and plot area by layout. The use of multiple layout tabs is acceptable with the digital filename representing the series of layouts into the filename.

Using a conventional database terminology, the models are the data, and the sheets are the reports of the data.

5.2 Base Drawings

Base drawing information shall be created at a scale of 1:1. Drawing components shall be created on appropriate layers and shall be 'COLOR BY LAYER' to enable referencing disciplines to manipulate their final plot appearance.

All graphic entities shall be comprised of representational and geometrically accurate entities, e.g. a circle shall be represented by circle entity and NOT a visually equivalent collection of line segments. Items shown in a dashed line-type shall be created with the LINETYPE feature and NOT by individual line elements.

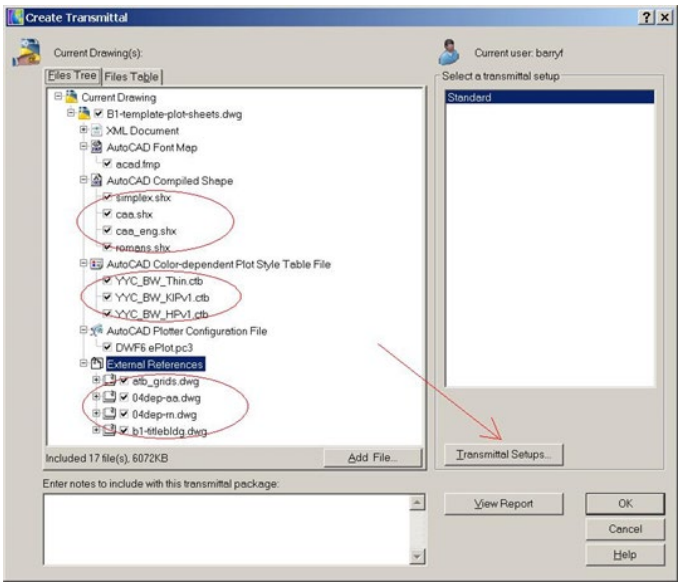
Base drawings are X-referenced directly into Model space and placed in Title Block using viewports.

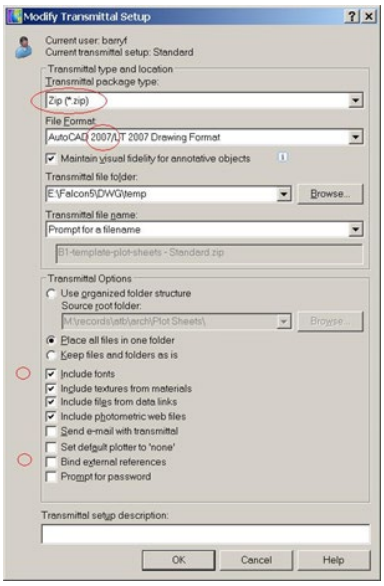
5.3 External Reference Files

When X-referencing files, ensure the UCS is set to the World Coordinate System and the files have an insertion point of 0,0. When exchanging files with other users (to or from consultants) ensure to provide all required xref files.

The use of the AutoCAD “eTransmit” command is the best method to ensure all required files associated with the file are included. This includes at a minimum, AutoCAD Complied Shape files (font and linetype), AutoCAD Color-dependence Plot Style tables and the External References.

Using eTransmit, in the Create Transmittal Setup.., set package type to .zip, select AutoCAD 2007 File format, Include Fonts and Deselect Bind external references (see below external reference binding).





When working with AutoCAD External Reference Files, the use of XREF Bind/Bind command is not acceptable with final drawing deliveries. This command creates files that contain long layer, font, block, linetype names and are unacceptable for future use. Files received using this method will be need to be re-delivered using eTransmit option. The use of hardpathing is also to be avoided. This is so files delivered to the client may be opened without problems of the files searching for paths that do not exist on the client system.

When delivering final files ensure all external reference files that are required are loaded and files that are not required have been detached. Do not leave orphaned xref files attached.

Reference file type of "OVERLAY" should only be used, do not use the Attachment mode unless the specific project configuration warrants Attachments (see section 3.1 Directory Structure - xref pathing options).

The use of External Reference Bind/Bind command may have its place when dealing with project steps and securing a snapshot in time as the project evolves (see section 5.17 Project Workflow). Typically the Bind/Bind command is not used due to the long layer, block, text and linetype names it creates.

5.4 Image Files (Raster Files)

The Airport Authority uses AutoCAD Raster Design to help with the insertion and manipulation of Orthophotos. If raster images are used within project drawings, all related files supporting the image such as information on coordinates, rotations angles, scales etc. (tfw, jgw, sdw) are to be provided. These files are essential for proper geo-referencing of the images.

5.5 Details

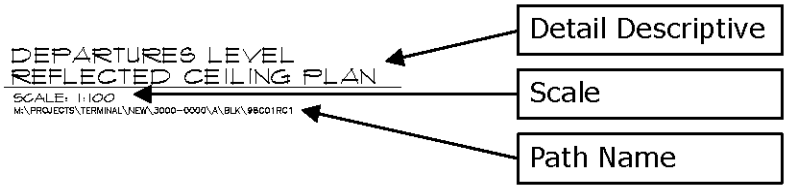
Display cutting plane shall be between 1200 - 1800 AFF. Objects below this cutting plane are displayed only on the floor plan. Objects above cutting plane are displayed

only on reflected ceiling plans. Objects intersecting the cutting plane are displayed on both plans.

All details shall use associative dimensioning. Details may be X-referenced directly onto Title Block sheets. Details shall be located with a common origin of 0,0,0 located in vicinity of the lower left hand corner of the detail.

Drawings shall contain the detail reference number of the Details being X-referenced. Detail Titles shall include detail name and where applicable the path of the detail. When standard details are used from standard library, the required files shall be copied to BLK directory, renamed to Detail Drawing Numbering sequence, modified only if required then X'ref onto the title block sheet. Standard details shall not be X-referenced directly from library directories as they may be periodically updated or deleted without notice.

Detail Referencing:



5.6 Standard Drawing Sheets

Sheet borders, title block, consultant's stamp logos and all other components of the master drawing sheet shall be in paper space. All graphic representations of the project or facility and all related notes, dimensions, symbols, etc., shall be constructed in model space.

Sheet Sizes are to be limited to three standard formats. Required sheet size is specific to each project and is under the discretion of The Airport Authority. The sheet sizes are as follows:

1. ANSI A - 216mm x 279mm (Letter – 8.5 x 11, Portrait or Landscape)
2. ANSI B - 279mm x 432mm (Tabloid – 11 x 17, Portrait or Landscape)
3. ISO B1 - 707mm x 1000mm (Airport Authority Large Format Standard)

5.7 Templates

Template drawing files and symbols provided by the Airport Authority are to be used, these include:

- Project Cover Sheets
- Project Title Blocks
- Drawing Symbology and Other Blocks
- Dimension and Text Styles
- Airport Authority Layers

The templates drawing also have AutoCAD units (-dwgunits, -aecdwgunits, -aecdwgsetup) set as follows:

- Building drawings to millimeters
- Site drawing to meters

5.8 Cover Sheet

There should only be one cover sheet per project. The cover sheet is to be kept current as project evolves with new sheets added or removed as required.

5.9 Title Blocks

The Airport Authority provides Drawing, Project and Contract numbers for use in the title block (see Section 3.2 for digital file/drawing naming). These numbers are assigned for file and retrieval purposes and are to be included in the tender, construction, and final record drawings. Consultants may modify title blocks to include prime and sub-consultant names and logos in the designated locations. There is also a space in the title block for consultants to show their project or file number for their purpose.

5.10 Dimensioning

All dimensions shown in the project submittals shall be fully associative and placed on appropriate layers. Dimension definition points should be located with an appropriate Object Snap (End Point, Mid Point, etc.) or otherwise located precisely on the project geometry. Manual input of dimension text or non-associative dimensions are NOT acceptable in submittals to the Airport Authority.

Note: Due to the different units used in Building (millimetres) and Site drawings (metres) different dimension styles are used.

Dimension Styles are included in template files.
They include CAA_MS1 (model space dimensioning), and CAA_PS1 (paper space dimensioning).
All settings are inclusive in the style.

If unable to use one of the provided styles, start a new style and set the dimension variables as shown below.

The following is an example of a Site - Metre (building/millimetres settings will be different):

Dimension Variables:
Dimension Lines: spacing = 10; color >by layer
Extension Lines: extension = 2; origin offset = 2; color >by layer.
Architectural Arrowheads: users arrow = Dimtick; size 1.5
Engineering Arrowheads: Closed filled = size 1.5
Scale: Set to Drawing Scale
Horizontal Justification = centred.

Vertical Justification = above.
Primary Units = decimal; precision 0.000

If dimensions are placed in paper space ensure to change "dimlfac" to the scale of the viewport.

5.11 Text Styles

Airport specific fonts caa_eng.shx and caa_arch.shx are required to be placed in a AutoCAD search path for proper display of these fonts. Copies of these fonts are available from the Airport Authority for external consultant use and are supplied in the Airport Authorities Standards package.

Text used on Calgary Airport Authority projects shall follow the styles listed below. Standard notation text size on file plotted drawings shall be 2.5mm, however a size of 2.0mm is allowed in areas of congestion. Keep the use of multiple text sizes on a single drawing to a minimum so the drawing is uniform and easy to read as determined by lead technologist.

Note: Due to the different units used in Building (millimetres) and Site drawings (metres) different Text Styles are used. The following is an example of a Building (site/metres settings will be different).

General Notation - plans and details

Style XFine, Font CAA_Eng, Size 200mm	or	Style XFine, Font CAA_Arch, Size 200mm
Style Fine, Font CAA_Eng, Size 250mm		Style Fine, Font CAA_Arch, Size 250mm
Style Medium, Font CAA_Eng, Size 300mm		Style Medium, Font CAA_Arch, Size 300mm
Style Large, Font CAA_Eng, Size 400mm		Style Large, Font CAA_Arch, Size 400mm

Detail Titles - as predefined attributes
Miscellaneous Symbols - as predefined attributes
Title Blocks - as predefined attributes

Airport Specific Fonts

FONT = STANDARD

key alone	`1234567890-=qwertyuiop[]\asdfghjkl;'zxcvbnm,./
CAPS LOCK	`1234567890-=QWERTYUIOP[]\ASDFGHJKL;'ZXCVBNM,./
SHIFT	~!@#$%^&×()_+QWERTYUIOP{}|ASDFGHJKL:"ZXCVBNM<>?

FONT = CAA_ENG

key alone	²1234567890-=qwertyuiop[]³asdfghjkl;'zxcvbnm,./
CAPS LOCK	²1234567890-=QWERTYUIOP[]³ASDFGHJKL;'ZXCVBNM,./
SHIFT	Ω£@#$%°&*()_+QWERTYUIOPø°±ASDFGHJKL:"ZXCVBNM<>ø

FONT = CAA_ARCH

key alone	²1234567890-=qwertyuiop[]³asdfghjkl;'zxcvbnm,./
CAPS LOCK	²1234567890-=QWERTYUIOP[]³ASDFGHJKL;'ZXCVBNM,./
SHIFT	Ω¢@#$%°&*()_+QWERTYUIOPø°±ASDFGHJKL:"ZXCVBNM<>ø

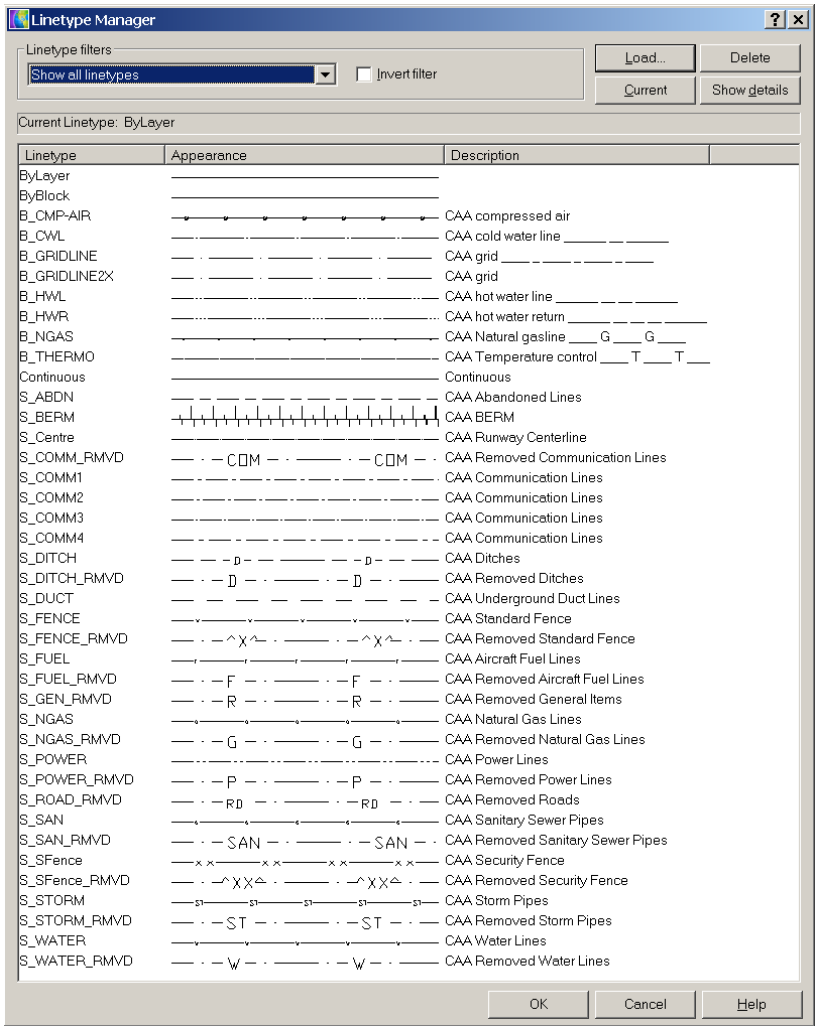
5.12 Line Type

The Airport Authority specific line type file CAA.LIN contains approved line types created for use with Airport Authority drawings. Line types are based on the ACADISO.LIN (AutoCAD metric) file.

For proper display of these airport specific lines the file CAA.SHX must be placed in an AutoCAD search directory. A copy of this file is available from the Airport Authority for external consultant use and is supplied in the Airport Authorities Standards package.

Line type names starting with "B" are used in the building drawings, names starting with "S" are used in the Site drawings. The remainder of the name describes the type of line for example S_SFENCE (Site Security Fence) or B_NGAS (Building Natural Gas), etc.

Site drawings contain a theme for removed and abandoned features. The abandoned features are known to be abandoned in place. The removed are items were once in place and removed by a previous project.



5.13 Standard Symbols & Blocks

AutoCAD blocks are used to group entities. These graphical blocks shall not be exploded. The use of nested blocks (blocks within blocks) shall not be used. Blocks should be created with linetype and color "ByLayer". This allows complete control over the appearance of the symbol. By default, the block will take on the properties of the layer it's placed on but can be changed to suit the requirements independent of the layer settings (not recommended, but mentioned for clarity of use).

There are three different types of Blocks: Real, Common and Symbol.

- Real are dimensionally accurate pictorial of a real object and inserted at 1:1.
- Common blocks are also real objects by are scaled to represent different sizes such as doors, lights, etc.
- Symbol are pictorial representation of the object not drawn to scale and are inserted into the drawing at a certain scale. Symbols are to drawn at the actual plotted size

and not smaller than 2.5mm. Symbols should be inserted using the plotted scale if they are inserted in model space and at 1 if inserted in paper space.

The Airport Authority Standard Symbols are available for use and are recommended for standardization throughout the files. Blocks are built on layer "0", the insertion point within the block should be at 0,0,0. Typically blocks used in the building are drawn so they display properly at a scale of 1:100 when inserted at a scale of 1. Blocks are inserted on the layer according to its use. Standard naming convention for blocks to include discipline letters then descriptive text. Example: E-FIDS (Electrical - Flight Information Display). The name should be short and concise, keeping the length to 8 characters.

When blocks contain attributes all relevant attribute fields are to be filled out.

5.13.1 **Mechanical Blocks**

CAA MECHANICAL LINETYPES AND SYMBOLS

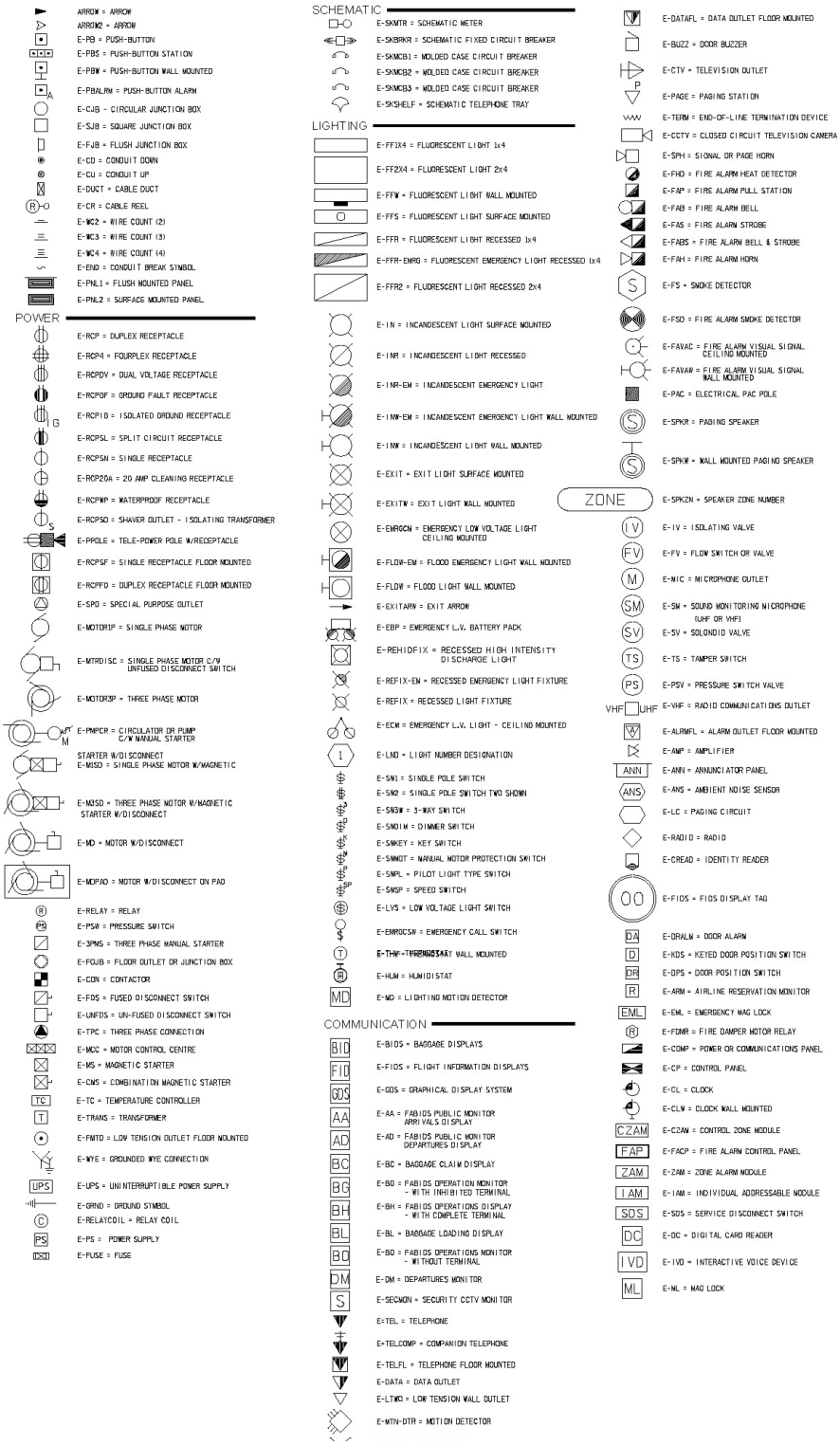
MECHANICAL BLOCKS

- PIPE DROP
- PIPE RISER
- PIPE BOTTOM TAKE-OFF
- PIPE TOP TAKE-OFF
- FLEXIBLE CONNECTION
- FLOW DIRECTION
- PIPE BREAK
- PIPE CAP
- CLEANOUT PLUG TYPE
- CLEANOUT FLOOR TYPE
- P-TRAP
- ANCHOR POINT
- RUNNING TRAP
- UNION
- STRAINER
- HOSE BIBB
- NON-FREEZE HOSE BIBB
- THERMOMETER
- ROOF DRAIN
- FLOOR DRAIN
- FUNNEL FLOOR DRAIN
- AIR VENT
- PUMP
- BALL VALVE
- BALANCING VALVE
- GATE VALVE
- GLOBE VALVE
- CHECK VALVE
- BUTTERFLY VALVE
- PRESSURE REDUCING VALVE
- SAFETY OR RELIEF VALVE
- SOLENOID VALVE
- 2-WAY CONTROL VALVE
- 3-WAY CONTROL VALVE
- BACKWATER VALVE
- PLUG VALVE
- SUPPLY DIFFUSER
- RETURN AIR GRILLE
- DOOR GRILLE
- FIRE DAMPER
- BALANCING DAMPER
- MOTORIZED DAMPER
- THERMOSTAT
- HUMIDISTAT
- SIAMESE CONNECTION
- FIRE EXTINGUISER
- FHC FIRE HOSE CABINET
- FIRE HYDRANT
- UPRIGHT SPRINKLER HEAD
- PENDANT SPRINKLER HEAD
- SIDEWALL SPRINKLER HEAD
- CONCEALED SPRINKLER HEAD
- DRY SPRINKLER HEAD

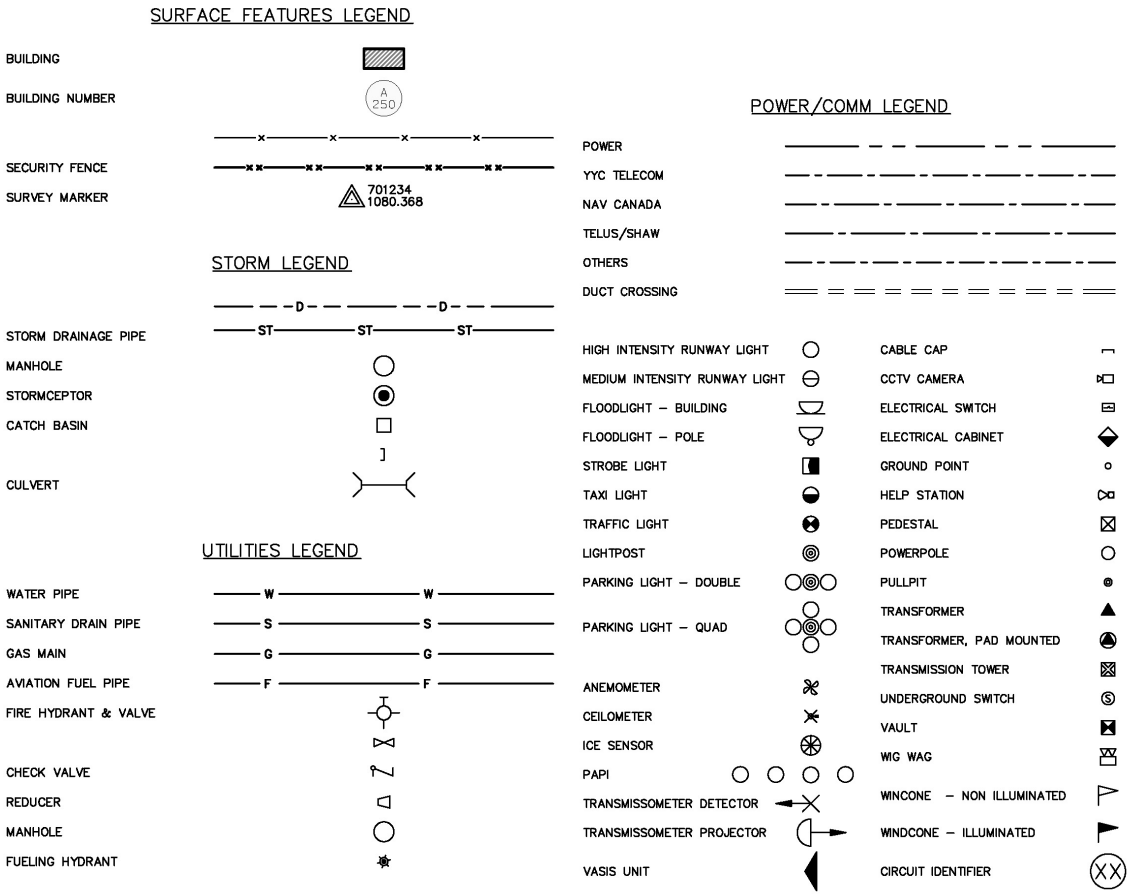
MECHANICAL LINETYPES

- DOMESTIC COLD WATER
- DOMESTIC HOT WATER
- DOMESTIC HOT WATER RECIRC.
- SANITARY ABOVE SLAB
- SANITARY ABOVE SLAB
- ST STORM SEWER ABOVE SLAB
- ST STORM SEWER ABOVE SLAB
- V SANITARY VENT
- LG LOW PRESSURE NATURAL GAS
- MG MEDIUM PRESSURE NATURAL GAS
- CA COMPRESSED AIR
- LS LOW PRESSURE STEAM
- F FUEL OIL
- RAD RADIATION HEATING SUPPLY
- RAD RADIATION HEATING RETURN
- 200 200F TEMP HOT WATER SUPPLY
- 200 200F TEMP HOT WATER RETURN
- 400 400F TEMP HOT WATER SUPPLY
- 400 400F TEMP HOT WATER RETURN
- CHW CHILLED WATER SUPPLY
- CHW CHILLED WATER RETURN
- GLYC GLYCOL COOLING SUPPLY
- GLYC GLYCOL COOLING RETURN
- GLYH GLYCOL HEATING SUPPLY
- GLYH GLYCOL HEATING RETURN
- REF REFRIGERANT
- FP FIRE LINE

5.13.2 **Electrical Blocks**



5.13.3 **Civil Blocks**



5.14 Pen Assignments

These pen assignments are provided to support the Airport Authority personnel in producing consistent hardcopy output to form the electronic submittals. The range of different types of lines should be kept to a minimum and once determined should be used consistently throughout the project.

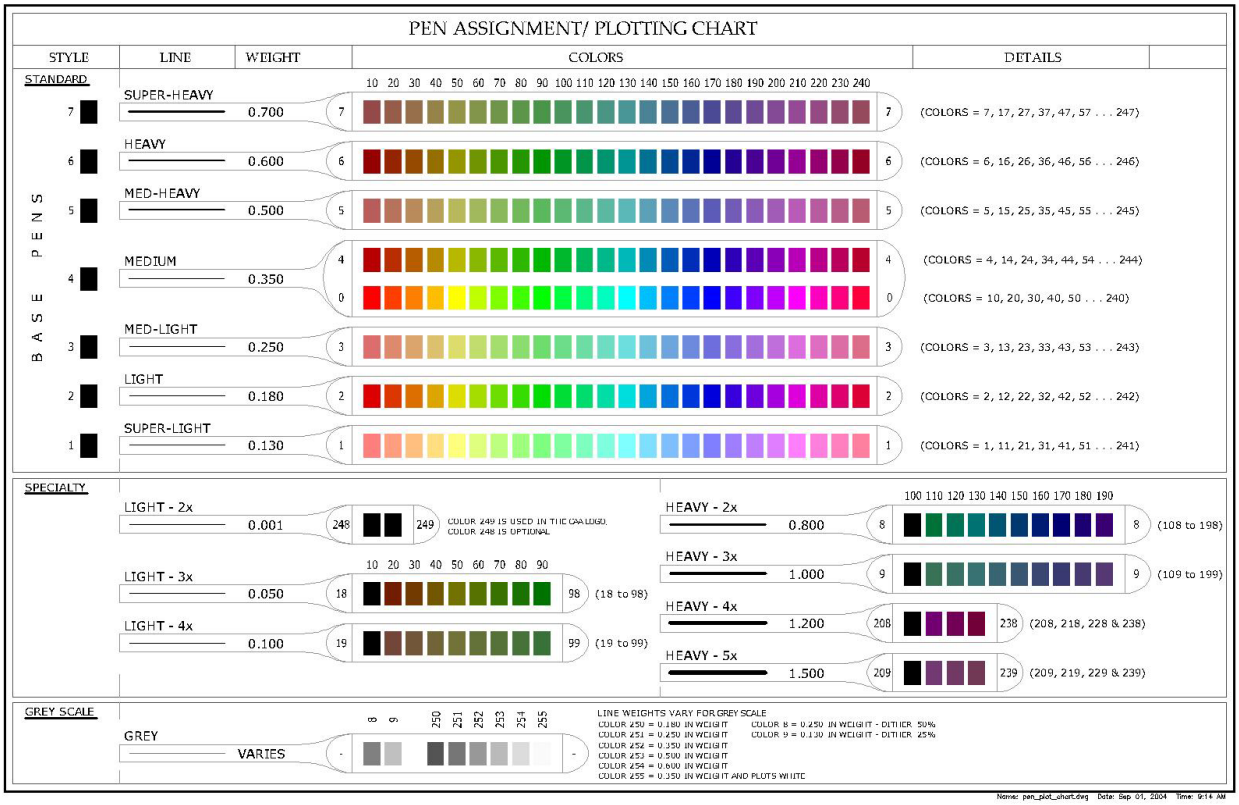
Consultants are solely responsible for the production and appearance of their hard copy submissions. Deliverables to the Airport Authority must contain CTB (or appropriate pen table) files so drawings can be reproduced later.

Submissions to the Airport Authority shall have color and linetype set by layer, colors and linetypes shall not be set by entity to ensure consistency and so files can interact and be referenced properly.

Airport Authority chart is setup with the last number of the color corresponding to the base pen thickness, for example 2, 12, 22 etc. are equal to a thickness of 0.18.

Variations are described below:

YYC_BW_HPv1.ctb – standard black & white
YYC_Color_v1.ctb - standard for color plotting with colors 1-7 set to black
YYC_Color_v2.ctb - standard for color plotting with all color are set to color



5.15 File Presentation

These Files presented are to conform to the following:

- Drawing files must be purged of all definitions that are not used such as layer, text styles, dimensions styles, layer filters, blocks, etc.
- A drawing must not contain any objects definitions without geometry such as empty text or blocks without objects.
- No objects shall reside on Layer "0" or DEFPOINTS except for objects contained in a block definition.
- A drawing must not contain any errors that are detectable using the Audit command.
- The drawing must be saved such as to be printed without any additional page setup.
- The main layout must be active and all viewports locked and set to the correct scale.

5.16 Room Numbering System

Room numbers assigned for the Air Terminal Building shall be assigned using the document Accepted Building Nomenclature - Grid Numbering (available upon request). This document

explains the radial grid system (both ATB and IFP) of the buildings that is used in the room number creation. Importance on assigning proper room numbers is described so reference to room number sequences is correct and features will not need to be renumbered to comply with the room numbering standard. Room numbers play an important role in the room lease documentation, mechanical equipment, and electrical power schedules.

5.17 Equipment Numbering

It should be noted the importance of communicating with the operations team, via the Airport Authority Project Manager / Project Coordinator to ensure new equipment such as elevators, escalators, electrical panels, electrical circuits are numbered in accordance with existing nomenclatures.

5.18 Project File Workflow

As the project evolves from Preliminary into Issued for Tender then into Issued for Construction, The Airport Authority requires a historic view of the project for future use. To facilitate this and keep the model up to date as the design and construction progress, a Bind/Bind copy may be made. IMPORTANT ensure to save this to a directory using the project class (preliminary, tender, construction) with a revision file number (see Section 3.2 File Naming Convention). This Bind/Bind copy will make a copy of the working file with all references bound into the one file. This process will allow historical viewing, plus allow the working model to stay intact for additional input and modifications as the project evolves.

At all stages, ensure the cover sheet is kept current with drawings issued and used. Multi-disciplined projects are to be delivered in one complete package.

6.0 DOCUMENT RESPONSIBILITY SCHEDULE

6.1 Submission Schedule

Responsibility timetable for submission of documents and digital data to SDS from In-House Design Team and External Consultants:

	In-House Design	External Consultants
Tender Documents		
PDF Files for printing	Tender advertising	One week prior to advertising
CADD Data Files	Tender advertising	Tender advertising
Addendum Documents		
PDF Files for printing	Tender close	Tender close
CADD Data Files	Tender close	Tender close
Construction Documents		
PDF Files for printing	Prior to construction start	Prior to construction start
CADD Data Files	Within 14 calendar days of PDF delivery	Within 14 calendar days of PDF delivery
Record Documents		
PDF Files for printing	Within 45 calendar days of project completion	Within 45 calendar days of project completion
CADD Data Files	Within 45 calendar days of project completion	Within 45 calendar days of project completion

Documents include, but are not limited to: drawings, specifications, O&M manuals, or other data required for future use by The Airport Authority.

6.2 Submission Cataloguing

Data files submitted by consultants shall be labelled to include project coding, file names, operating system, and date (See Section 2.2 for required formats). It is the consultant's responsibility to ensure that the projects sets are delivered together in complete packages in proper sequence order following the above time schedule.

6.3 Tender, Addendum, and Construction Stage Requirements

Data files submitted by consultants shall conform to the following:

1. Provide AutoCAD drawings using the File eTransmit command (See Section 5.3).
2. Provide PDF's of drawings and specification. PDF's are to be created at 1:1 scale based on the output paper size originally created for ISO B1. The PDF's are to include professional seals, permits and revision stating date and project stage.

6.4 Record Stage Requirements

Data files submitted by consultants shall conform to the following:

1. Record drawing process must also be underway prior to project substantial performance.

2. Record drawings shall be tied to project substantial performance.
3. Provide AutoCAD drawings using the File eTransmit command (See Section 5.3).
4. Provide PDF's of drawings, final specifications, operations & maintenance manuals, and any other record data related to the project. PDF's are to be created at 1:1 scale based on the output paper size originally created for ISO B1. The PDF's are to include professional seals, permits and revision stating date and project stage.
5. Submission timelines may be extended with the approval of Spatial Data Services. Extension Requests must be made at completion of construction.

7.0 RECORD DRAWINGS

7.1 Requirements

During the project life cycle the following file management routines should be incorporated to ensure a neat complete project history is compiled to help with the final creation of the record drawings. "Record Drawings" are certified drawings that stamped and signed by the professional of record and represent the final drawings issued and that incorporate such items as addenda, change orders, measurements and any significant modifications made during construction. These are usually a compendium of the original drawings, site changes known to the consultant and information taken from the contractors red line drawings and data.

1. All disciplines should use the current base plan (received from Architectural, Site or lead discipline) when producing the record drawing set.
2. Ensure that unique file naming conventions are used throughout the project, adding detail type and number (names) to describe the details and xref's accurately. Use unique drawing number assigned to project at project start-up.
3. Use of the project directories by discipline to arrange plots sheets separate from the master and external reference files.
4. At the issued for tender stage for the sake of reproducing this set of drawings at a later date, bind the set together and place the files in the sub-directory named "Tender". As the project construction cycle continues, add and make changes to the plots sheets and project xref models so when all details from change orders, field orders and on-site mark-ups have been added, the resulting project directory will contain a set of plot sheets and xref files that represent your final record drawings set.
5. Update the drawing revision note and date to record drawings.
6. Save the drawings in a final plot state with non-relevant layers frozen and non-relevant xref's detached.
7. Produce final plots to a PDF format of all sheets generated. These plots are to be plotted at 1:1 scale and on the paper size the drawing were created to be printed on (standard size is ISO B1 format). The PDF files are to include professional stamps and permits, with proper dates and record drawings revision notes in the revision area. DO NOT PASSWORD PROTECT PDF FILES.
8. Use the AutoCAD eTransmitt command (see section 5.3). Settings within command: format set to .zip, include all xrefs files, fonts files, plotting .ctb files, images files, etc.
9. Refer to the Deliverable Requirements – Consultant Checklist deliverable details of drawing sets, shop drawings and O/M manuals.

APPENDIX C –COLOURING/LABEL SPECIFICIATIONS

1.0 PIPING

1.1 Locations

a) On long straight runs in open areas in boiler rooms, equipment rooms, galleries, and tunnels so that at least one is clearly visible from any one viewpoint in operating areas or walking aisles and not at more than 17m intervals.

b) Adjacent to all changes in direction.

c) At least once in each small room through which piping passes.

d) On both sides of visual obstruction or where run is difficult to follow.

e) On both sides of any separation such as walls, floors and partitions.

f) Where piping is concealed in pipe chase, ceiling space, gallery or other confined space, at entry and leaving points and adjacent to each access opening.

g) At beginning and end points of each run and at each piece of equipment in run.

h) At point immediately upstream of major manually operated or automatically controlled valves. Where this is not possible, place identification as close to valve as possible, preferably on upstream side.

i) Legend to be easily and accurately readable from usual operating areas and all readily accessible points.

j) Plane of legend to be approximately at right angles to most convenient line of sight with consideration of operating positions, lighting conditions, reduced visibility of colour or legends caused by dust and dirt and risk of physical damage.

k) Painted stencil black lettering.

1.2 Colour Coding Schedule

a) Colour numbers are called for in Canadian Government Specification No. 5-GP-1a. Colours assigned from CGSB 1-GP-12c for colour code identification.

<u>Mechanical Primary Colours For Pipe Lines/Equipment</u>

Yellow	505-102
Light Yellow	N/A
Light Blue	502-106
Green	503-107

Light Green	N/A
Orange	508-102
Light Orange	N/A
Brown	504-103
Red	509-102
White	513-101
Aluminum	515-101
Purple	501-101
Grey	501-107

Secondary Colours for Bands

Red	509-102
Orange	508-102
Blue	502-106

Banding

b) Banding to match the airport's existing system for identification.

c) Identification Symbols and Colour for Piping:

	Pipe Colour	Stripe Colour	Symbol
Chilled Water Ret	Green	None	Ch W R
Chilled Water Supp	Green	None	Ch W S
Chilled Glycol Ret	Light Green	None	Ch Gly R
Chilled Glycol Supp	Light Green	None	Ch Gly S
Condenser Water Ret	Green	None	CWR
Condenser Water Ret	Green	None	CWS
Radiation Heating Hot Water Ret	Yellow	None	HWR
Radiation Heating Hot Water Supp	Yellow	None	HWS
Heating Hot Water Ret	Yellow	Orange	93° C R
Heating Hot Water Supp	Yellow	Orange	93° C S
High Temp Heating Hot Water Ret	Yellow	Red	HTHWR
High Temp Heating Hot Water Supp	Yellow	Red	HTHWS
Heating Glycol Return	Light Yellow	None	H Gly R
Heating Glycol Supply	Light Yellow	None	H Gly S
Steam – Low Pressure	Light Orange	None	LPS
Natural Gas	Yellow	None	Nat Gas
Sprinkler	Red	None	Sprinkler
Stand Pipe (Dry)	Red	None	Dry Stand Pipe
Stand Pipe (Wet)	Red	None	Wet Stand Pipe
Domestic Cold Water	White	None	DCW
Domestic Hot Water	White	None	DHW
Domestic Hot Water Recirc	White	None	DHWR
Drain	Aluminum	None	Drain

APPENDIX D –INTERNATIONAL TERMINAL ONLY: EXHAUST HOOD DEMAND CONTROL SYSTEMS SPECIFICATIONS

Operators Manual

Installation, Operations and Maintenance Instructions

M.A.R.V.E.L.

(Model-based Automated Regulation of Ventilation Exhaust Levels)

Halton

Table of Contents

M.A.R.V.E.L. System Overview

General Description

Halton's M.A.R.V.E.L. (Model based Automated Regulation of Ventilation Exhaust Levels) system offers a **demand control ventilation** (DCV) solution. M.A.R.V.E.L. builds upon the existing Halton product line, such as the Capture Jet® technology, to deliver a product that reduces energy costs by scheduling and adjusting exhaust airflow based on hours of operation and appliance use.

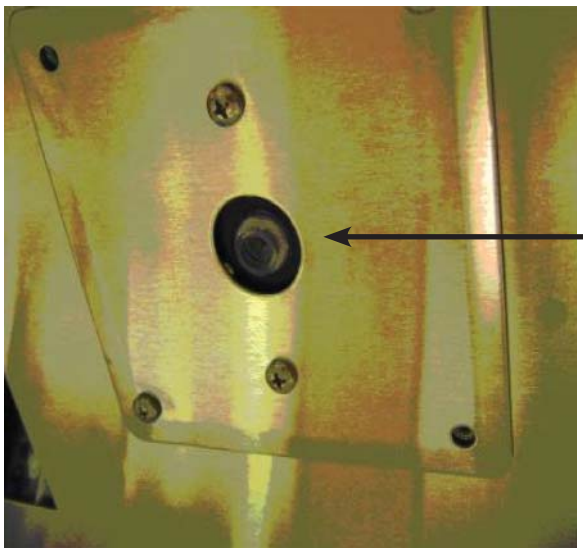
Halton's M.A.R.V.E.L. delivers:

- Hood exhaust airflow adjustment depending on cooking activities
- Control of common exhaust fan for minimum energy consumption at all times
- Automatic or on schedule start/ stops
- Automatic balancing dampers
- Early fire warning signals
- Internet monitoring and programming

M.A.R.V.E.L. Unique Design

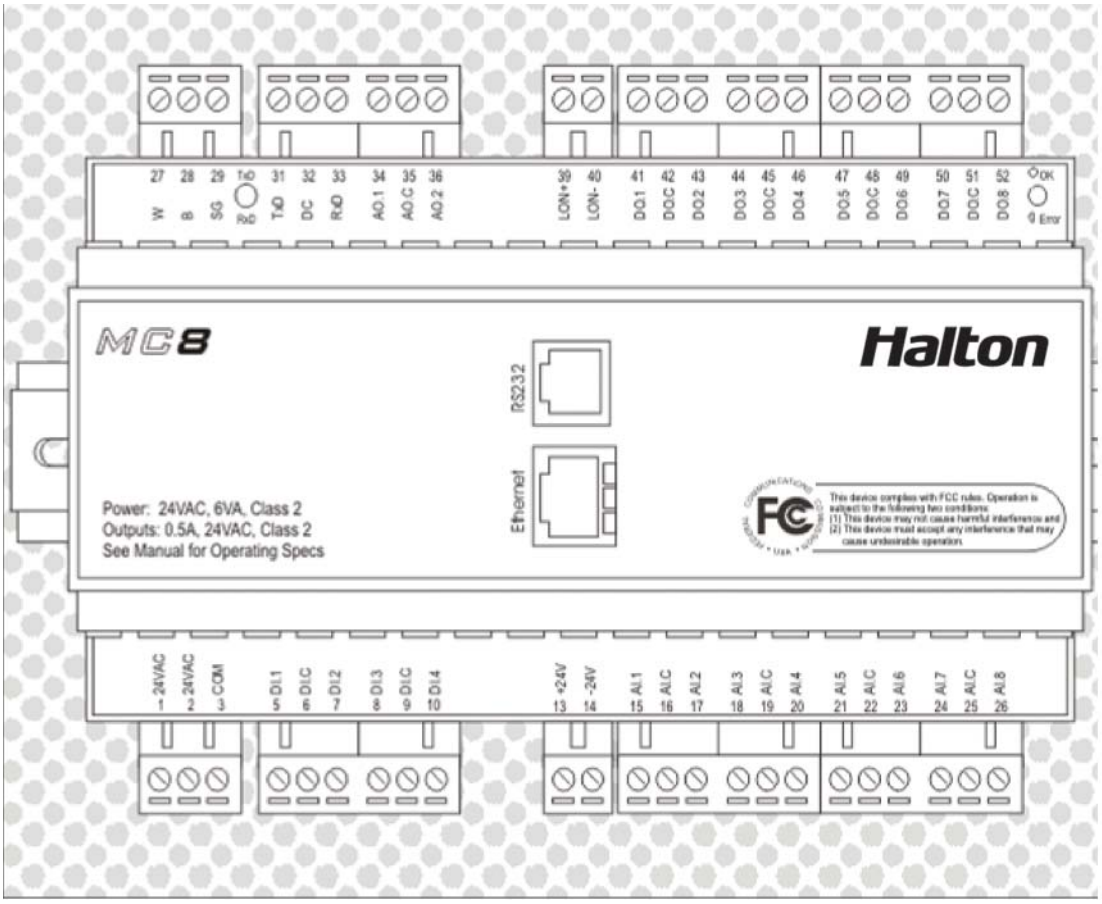
Starting with the Halton extensive product line of commercial foodservice ventilation solutions, M.A.R.V.E.L. adds the following four unique components:

IRIS™ infrared temperature sensors: Used to measure the rate of change of the cooking surface temperature, the sensor acquires a "heat signature" of the equipment positioned below each sensor. The thermopile-based device is placed in the ball socket fixture in the Capture Jet® plenum. An air jet exits the plenum around the sensor to protect the optic sensor from dirt and cooking debris. The sensor can be easily moved and re-aligned as needed using the provided Laser Alignment Tool.



MC8 Controller: The heart of the system, the controller features 22 inputs/outputs and is designed to collect real time information and to implement various automation control algorithms. The MC8 Controller responds to the infrared sensor(s) and duct temperature sensor to measure changes in cooking status.

Example:



Differential Pressure Transducer: Used in conjunction with the value from the temperature sensor and IR Index to measure and control the airflow thru each hood. In addition, for multiple units with a common exhaust fan, there is an additional differential pressure transducer mounted on the common exhaust duct.

Temperature Sensor: Located in the hood collar, the temperature sensor is used in conjunction with the pressure transducer value and IR Index to control the airflow.

M.A.R.V.E.L. System Components

Overview

A key feature of the M.A.R.V.E.L. system is flexibility. It can be applied to a single hood – or over multiple hoods – depending on the requirements.

Figure 1: Single Hood M.A.R.V.E.L. Installation

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Figure 2: Multiple Hood M.A.R.V.E.L. Installation

Components

NOTE: Refer to Figure 1+2

Equipment	Description	Power + Connection Details
IR1, IR2, IR3 Infrared radiation sensor (IRIS™)	• Mount 1 to 4 IRIS™ sensors per hood depending on the length of the hood. • Calculates an index which averages the temperature radiation over the sensor's field-of-view. • Used to detect when one or more pieces of cooking equipment are turned on and it is necessary to start the hood fan in idle mode. • Used to measure a rapid change in temperature of cooking surfaces (for example, cooking activities) and adjust the air flow in the hood to the required level.	**Power source:** 5 volt DC power supply located in a control panel. **Connection:** at terminal block located behind a cover on the Capture Jet® plenum.
TS Duct temperature sensor	• Measures the temperature of the exhaust air. • Located in the hood collar. • Used (in conjunction with the IR Index) to detect the event of cooking equipment start-up. Duct temperature is often a better indicator of start-up in the case of certain types of equipment such as a gas fryer. • Used to activate the early fire detection alarm, activated before the fire system is triggered.	**Connection:** at terminal block located behind a cover on the Capture Jet® plenum.

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Equipment	Description	Power + Connection Details
PT Hood plenum pressure sensor	• Used to calculate air flow in a hood in real time.	**Power source:** 24 V DC power supply located in a control panel. **Connection:** at terminal block located behind a cover on the Capture Jet® plenum.
ABD Automatic balancing damper	*NOTE:* For multiple hood installations with a single exhaust fan only • Adjusts air flow with motorized balancing dampers attached to a collar at each hood. • Damper controlled by a 0-10 V DC position reference signal generated by a controller. • Upon power failure, the automatic balancing damper fully opens.	**Power source:** 24 V AC transformer located in the control panel. **Connection:** at terminal block located behind a cover on the Capture Jet® plenum
Alarm light and audible alarm/ buzzer	• Activated when any alarm condition is detected. • Common alarm conditions include: filter missing, filter clogged, fire suppression system activated, duct temperature dangerously high, sensor failed, or VFD is in fault. *NOTE:* To easily diagnose the alarm, use the remote Konsole™ Diagnostic Software.	
Override push button	• Used to override pre programmed operation. • Two modes: 1. Press and hold for 1 second to accelerate the exhaust rate to 100% of the design air flow for a pre programmed period of time (default 5 minutes.) 2. Press and hold for 3 seconds to accelerate the exhaust rate to 100% of the design air flow for a pre programmed period of time (default 1 hour.) Starts the hood if it has been overridden by a schedule or an 'off' state.	**Connection:** at terminal block located behind a cover on the Capture Jet® plenum.
Room temperature sensor	• Mounted on a kitchen wall close to a thermostat.	**Connections:** to the control panel with 2 wires
VFD Variable Frequency Drive	• Controls the speed of a three-phase fan motor by changing the frequency of the current to the motor. • For smaller fans, mount the VFD in a cabinet attached to a hood. • For larger exhaust fan units, attach the VFDs to a fan unit or cabinet or mount remotely.	**Power source:** varies as per fan's voltage requirement **Connection:** at terminal block in VFD control panel to main control panel **Speed reference:** 0-10 VDC

Equipment	Description	Power + Connection Details
CP Control Panel	• Mounted on top of each hood with access from the bottom. *NOTE:* For multiple units with a single fan, a separate control panel (see below) is also required. • Provides permanent Ethernet connection (optional). • Provides temporary Ethernet connection for service. • Provides RS232 cable connection for on-site service	**Power source:** 120 VAC, 5 amp. fuse, grounded
Central control panel (for multiple units with single fan)	• Separate control panel mounted at a convenient location to link that individual control panels on the hoods with the VFD controller.	**Power source:** 120 VAC, 5 amp. fuse, grounded

M.A.R.V.E.L. Sequence of Operations

Overview

A sequence of operations is a series of steps required to perform a given task. The DCV system uses the following sequence of operations to control the exhaust hood operation.

Sequence of Operations

Startup & Shutdown

Operation Step	Details

Startup	• Turns exhaust system on.
	• Can be started by:
	  • 24/7 pre-programmed schedule.
	  • The building management system or via an internet connection remotely.
	  • Using a locally mounted on/off switch.
	  • Reaching a pre-determined IR Index or duct temperature level.
	  • Pressing the override button.
	• After startup, enters Idle mode.

Shutdown	• Turns system off. • Can be shutdown by any of the parameters listed in the Startup step (above) except the override button.
Idle Mode	• System starts up in Idle mode (after startup). • Pending until signs of cooking activity sensed from IRIS™ sensor(s). • Minimal exhaust flow captures any appliance-generated heat. Default is 60% of design air flow or as adjusted to meet requirements. • After idle mode, enters Active mode.
Active Mode	• System moves into Active mode when an IRIS™ sensor detects cooking activities under the hood. • Exhaust fan speed increased to design air flow and balancing dampers (if present) adjusts the airflow in the hood to design level to assure sufficient capture and containment. • Air flow in the hood is maintained for a predetermined cooking time before returning to the Idle mode. *NOTE:* If during this time more cooking activities are detected, the cooking timer will be restarted.

Override Mode	• Used to override pre programmed operation.
	• Two modes:
	  1. Press and hold for 1 second to accelerate the exhaust rate to 100% of the design air flow for a pre programmed period of time (default 5 minutes).
	  2. Press and hold for 3 seconds to accelerate the exhaust rate to 100% of the design air flow for a pre programmed period of time (default 1 hour.) Starts the hood if it has been overridden by a schedule or an 'off' state.

Operation Step	Details
Fire Mode	• If a fire signal is detected in the kitchen, the system triggers a fire alarm and stops the make-up air fan. • The exhaust fan will either stop or continue running depending on the local fire code requirements.
Off Mode	• Exhaust and make-up air fans stop when no appliances are operating (e.g., turned off and cooled down).
Airflow Reporting and Replacement Air Control	• System continuously monitors exhaust airflow at each hood and generates a signal 0 to 10 V proportional to total exhaust airflow as fraction of total design. 0 V - system is off; 7 V - system operates at 70% of design airflow, etc. This signal is used to control Replacement air to maintain building pressurization.

Alarm and Fault Conditions	• System constantly monitors various parameters.
	If any unusual or abnormal condition is detected, an alarm is activated.
	• An alarm indicator can include:
	  • A local alarm light and buzzer on a control panel.
	  • Email or text message sent to a computer or a mobile device, pager, visual display on a computer screen or through a SCADA interface.

M.A.R.V.E.L. System Installation

The following installation steps ONLY apply to the M.A.R.V.E.L. components (IRIS™ Sensor, MC8 Control Panel, Pressure Transducer and Temperature Sensor).

Refer to the Capture Jet® Hood IO&M Manual for complete details on installation of the hoods.

Refer to the Halton engineering drawings for additional details.

Refer to the Halton wiring drawings for configuration details.

Refer to the fan manufacturer's manual for detailed instructions on the fan installation.

It is the responsibility of the installing contractor to see that the system installation is completed in accordance with the project plans and specifications and that it meets all specific requirements of local code officials. The local authority having jurisdiction could over rule some of the installation details written in this manual.

The installation shall be in accordance with NFPA-96. All electrical systems shall be installed following local and national codes.

If questions or complications should arise during the installation of the Halton hood (s) that cannot be solved using the instructions provided, please contact the Halton office at 1-800-442-5866, or (1-800-4-HALTON).

If a problem cannot be correct through verbal or written communication with Halton support, the system can be connected to the Internet for remote access to Halton engineers through the KONTAR-Konsole™ Commissioning and Diagnostic Software Interface.

If the site doesn't have reasonable access to the Internet, a wireless CDMA router can be shipped by Halton to the facility for temporary (or permanent) access.

Check all local codes prior to installation as special requirements may be necessary depending on local building material construction.

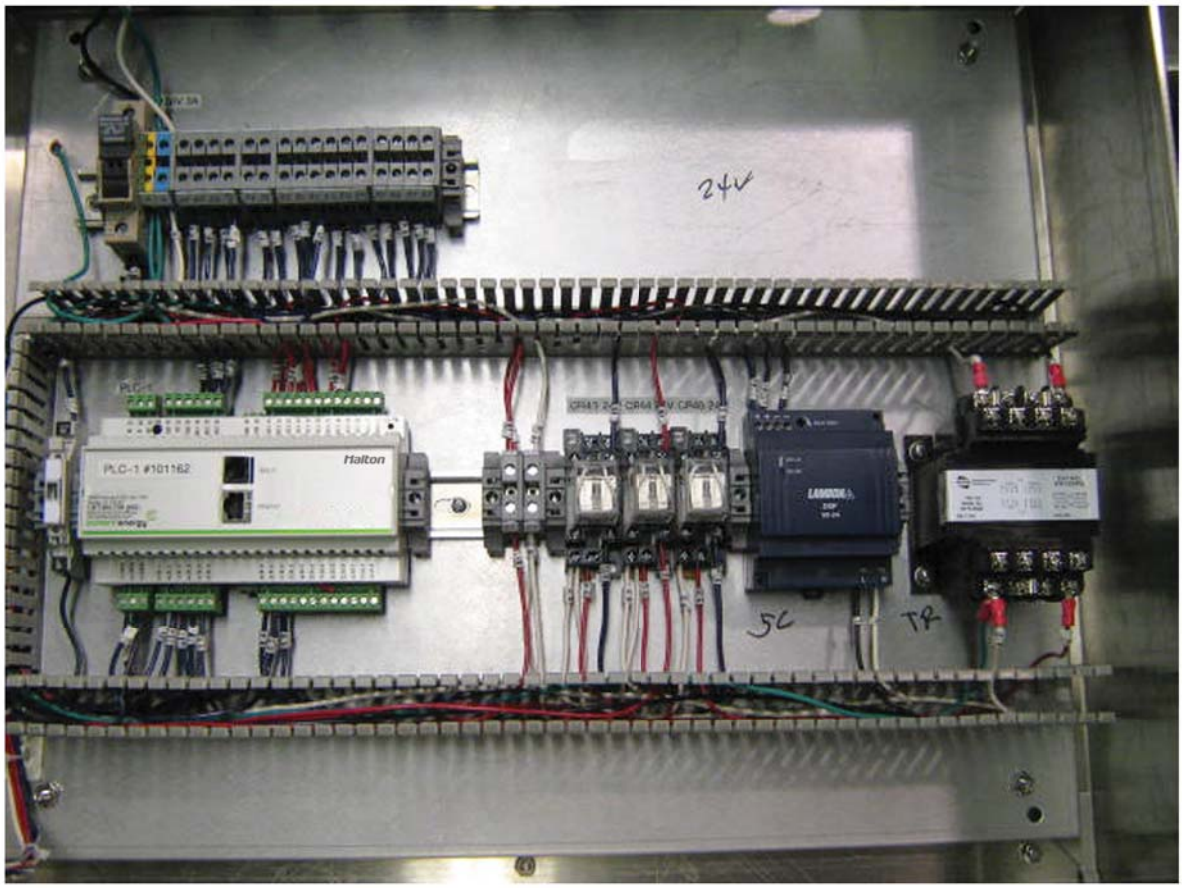
1. Mount the central control panel (for multiple units with a single fan)

NOTE: For all units, there is a pre-mounted control panel on the top of the hood.

1. The central control panel is supplied with mounting tabs that extend from the back wall up and down and provide at least four points of attachment. The appropriate mounting hardware is to be used depending on the unit size and the type of wall to be attached to.
2. Locate the central control panel at an appropriate mounting height (e.g., access to the control in the front door of the panel).
3. Attach the central control panel using the four mounting holes:
    - For concrete block walls, solid block and brick surfaces: Use sleeve stud anchors (recommended).

      Example:3/8 " dia.- thread:5/16-18; washer OD:7/8 "(Drill size 3/8 ")
    - For Plaster, Wallboard and Plywood: Use sleeve screw anchors(drive or drill style) (recommended).

Example: 1/4" - 20 drill size 7/16"



NOTE: If more than one control panel is used in a M.A.R.V.E.L. system with a single exhaust fan, connect them together to ensure that proper operation of the exhaust fan. Refer to the Halton supplied wiring diagram for details.

2. Make central control panel connections *(for multiple units with a single fan)*

Make the following connections at the central control panel:

a. 120 VAC, 5 amp power to control panel.
b. Space temperature sensor to control panel (2 wires).
c. Pressure transducer from common duct (2 wires).
d. VFD terminal block to control panel (6 wires shielded).
e. Connection to individual hood (2 wires shielded) (cable provided by Halton).
f. Connection to kitchen fire system (2 wires)
g. Permanent Ethernet connection (if specified).
h. UV or Water Wash control.

3. Connect VFD controller

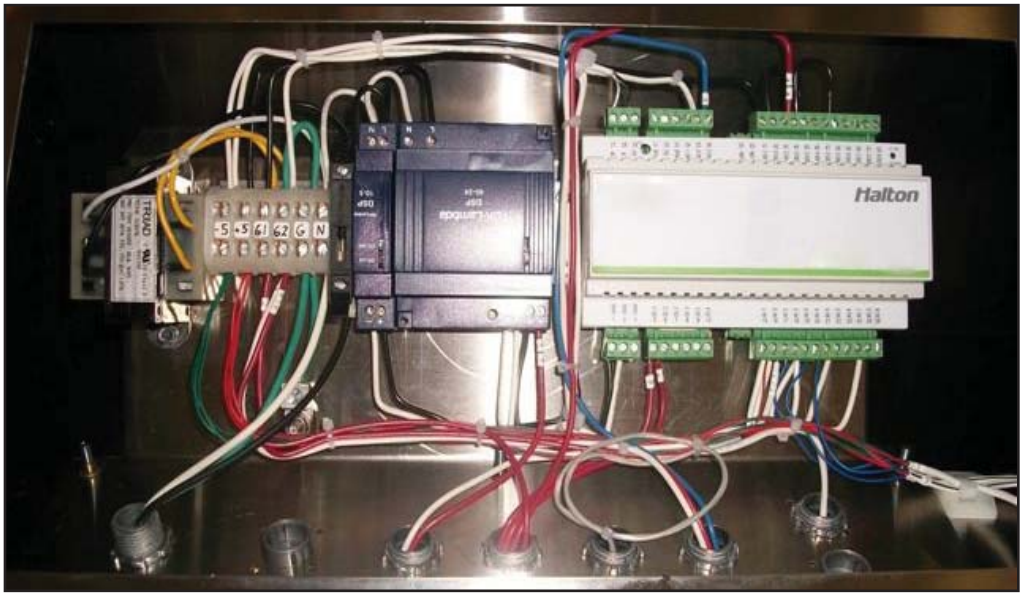
Connect VFD controller as per instructions provided. This includes:

a. Main power connection for the fan motor.
b. Connection to central control panel.

4. Connect control panel (on hood) to central control panel *(for multiple units with a single fan)*

Using 2 wire shielded cable provided by Halton, connect each unit to the central control panel. This includes:

1. Attach the wire to the terminal block in the control panel mounted on the hood.
2. Run the wire to the central control panel and connect the marked terminal block (identified by hood number)
3. Connections can be also made between hoods with 2 wire shielded cable and connect the hood closest to the control panel to terminals in the panel.



5. Check pressure transducer

1. Check the condition of the pressure transducer tubing on the top of the Capture Jet® hood. The tubing should be free from kinks.

6. Calibrate and align IRIS™ Sensor

NOTE: The IRIS™ Sensor is calibrated after installation in the hoods.

The sensor is tested using a 'black body' (does not reflect IR light) such as a sheet metal with a diameter of at least 16" (aluminum) and painted black). Always store this calibration tool away from direct sunlight and where the space temperature can be measured.

The IRIS™ sensor calibration is done in the factory. It has to be done in the field only when the sensor is replaced.

To calibrate the IRIS™ Sensor, follow these steps:

1. Install the IR sensors in the hood and terminate them.
2. Direct the IR sensors vertically down.
3. Start the control system and launch the Konsole™ software.
4. Bring the calibration tool closer to the sensor (approximately 3-5" from the sensor). The distance between the sensor and the tool should guarantee the field of view of the sensor will be completely within the black body surface.
5. Register the space temperature t (in ˚F).
6. Register the **IR _Temp** reading T (in ˚F).
7. Calculate the calibration offset: **Calib_Offset** = t – T
8. Assign this value in the Konsole™ screen to the appropriate parameter.
9. Check the **IR_Temp** reading. The reading should be equal to the hood's space temperature reading.
10. Align the IRIS™ sensor(s). See IRIS™ Sensor Alignment (Quarterly or as required), page 18 for details.

9. Calibrate the Capture Jet® exhaust air flows

Calibrate the Capture Jet® exhaust air flows using the T.A.B.™ (Testing and Balancing Ports).

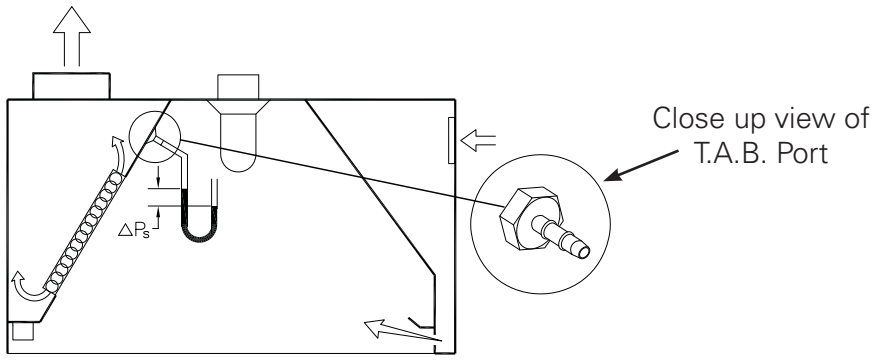
To determine the correct T.A.B. port reading for the exhaust hoods, follow these steps:

1. Ensure that the equipment is operating to create a thermal plume prior to the air balancer.
2. Determine the correct T.A.B. port reading (IWC) based on the Capture Jet® hood model.

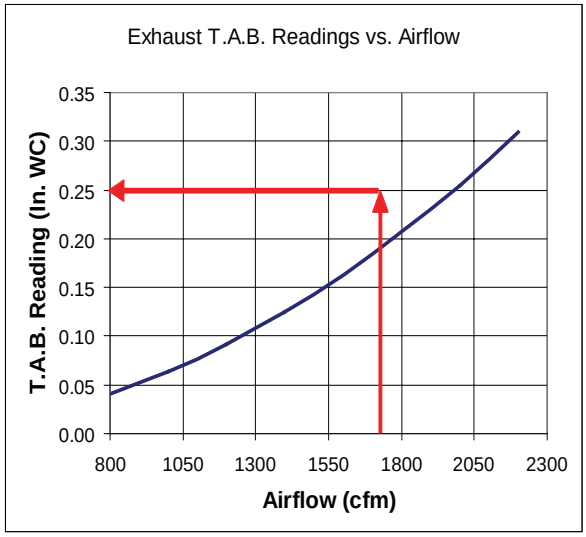
Capture Jet Hood Model	T.A.B. Port Readings Design T.A.B. (inches WC)
KVE/KVC	0.25
KVW	0.25
KVR	0.25
KVL	0.28

"Example Only"

3. Using the T.A.B. Port, take a reading in IWC.



4. Using the table below, confirm the design airflow (e.g., 1700 cfm), based on the T.A.B. Reading (e.g., 0.19 IWC).



"Example Only"

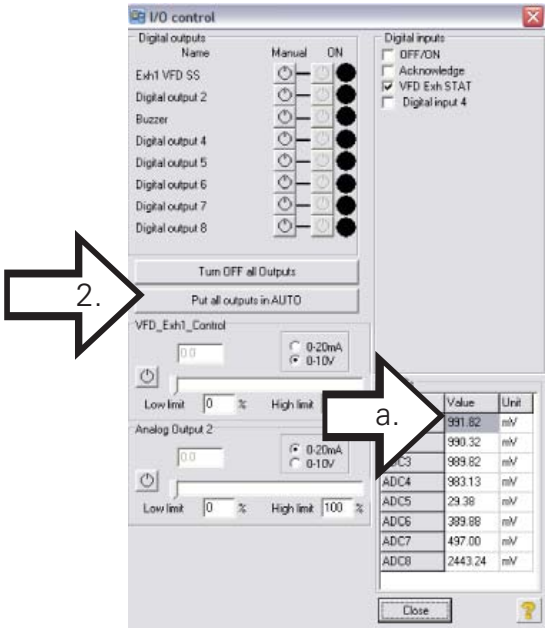
10. Calibrate M.A.R.V.E.L System *(for multiple units with a single fan)*

NOTE: Make sure that the filters are in place prior to calibration.

To calibrate the M.A.R.V.E.L. system, follow these steps:

1. Open the Konsole™ software (see KONTAR-Konsole™ *Software*, page 25 for more details).

2. Open the Controller (using the dropdown list) and open the I/O screen using the icon  from the toolbar. Click **Put all outputs in AUTO.**



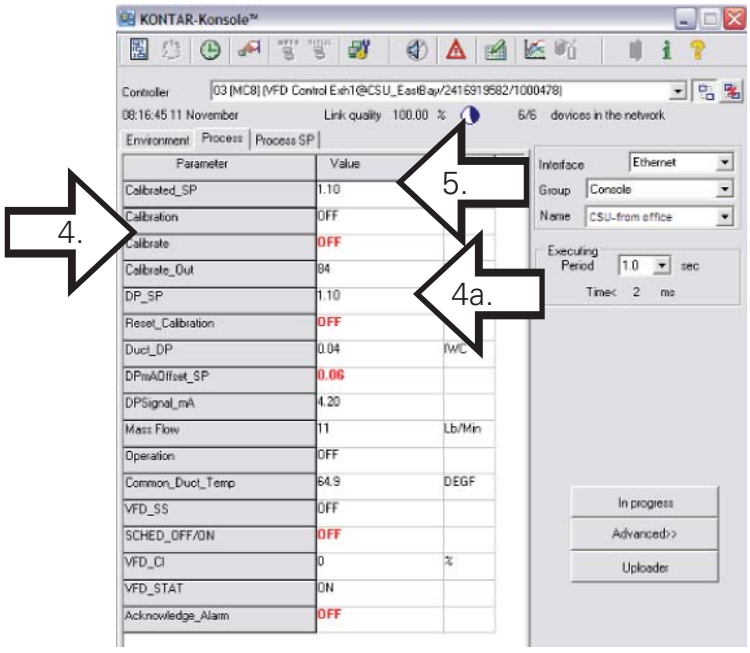
3. Repeat for all controllers
4. When the system is in automatic mode, select the VFD controller screen. Select the Process tab.

NOTE:

a. Click **Calibrate**.

This turns on the calibrate function and the calibration process beings. During the calibration process, leave ALL settings along.

b. Monitor the **Calibrate_Out** field. It starts at 100% and counts down until calibration complete (e.g., >0%)



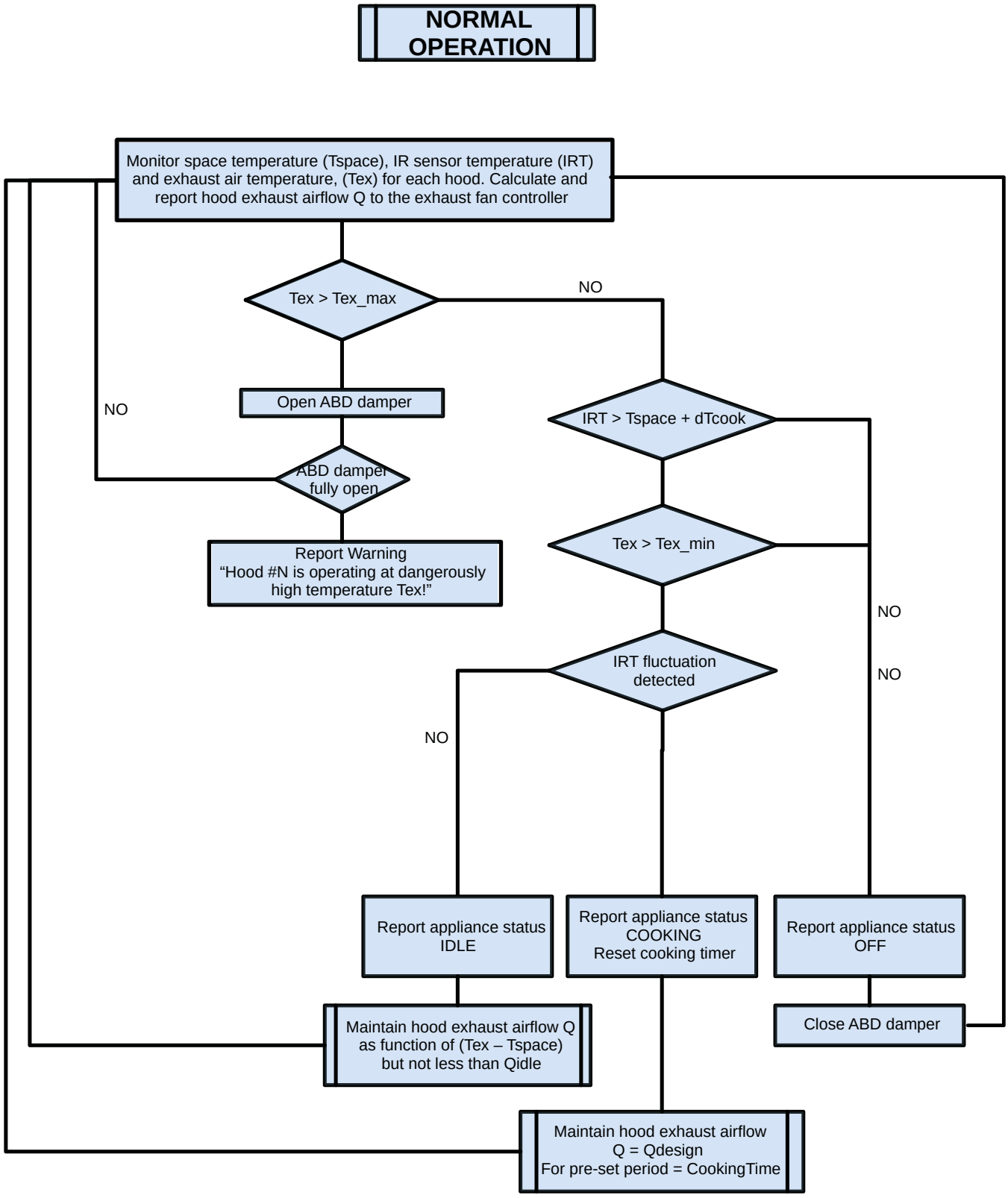
5. When the calibration is completed, confirm that there is a value > 0 in the **Calibrated_SP** field.

NOTE: If calibration must be aborted, select the **Reset_Calibration** field. When ready to re-run the calibration process, return to step 4a.

M.A.R.V.E.L. System Operation

NOTE: Refer to the Capture Jet® Hood IO&M Manual for complete details on operating the hoods.

The following steps ONLY apply to the M.A.R.V.E.L. components (IRIS™ Sensor, MC8 Control Panel, Pressure Transducer and Temperature Sensor).



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M.A.R.V.E.L. System Maintenance

General

NOTE: A preventive maintenance program is an important aspect of an effective safety program. Consult your manufacturing or other qualified consultant with question concerning changes observed during periodic inspections and routine maintenance.

Refer to the Capture Jet® Hood IO&M Manual for complete details on maintaining the hoods.

The following maintenance steps ONLY apply to the M.A.R.V.E.L. components (IRIS™ Sensor and Temperature Sensor).

IRIS™ Sensor Cleaning

NOTE: The IRIS™ Sensor is mounted on the Capture Jet® plenum door to allow an air jet to protect the sensor optics from contaminants. However, periodic cleaning may be required to keep the optics clear.

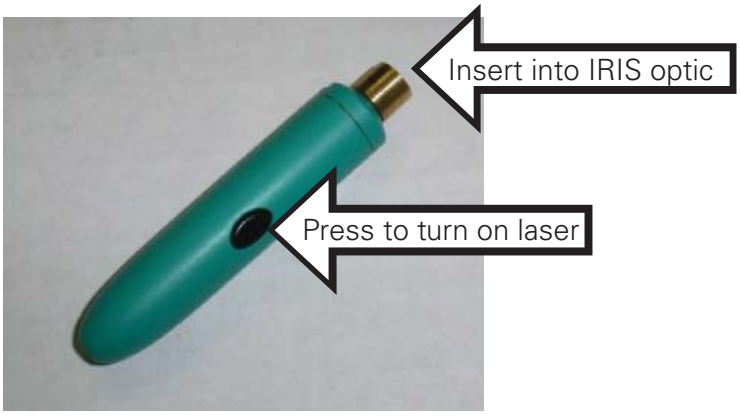
Gently clean the IRIS™ socket with isopropyl alcohol on a cotton swab (Q-tip™), as required.

Take care not to move the position of the optic; see below on how to realign the IRIS™ Sensor.

IRIS™ Sensor Alignment (Quarterly or as required)

To align the IRIS™ Sensor, follow these steps:

1. Insert the Laser Alignment Tool into the socket at the bottom of the IRIS™ sensor.



2. Press the laser button, located on the side of the *Laser Alignment Tool*.

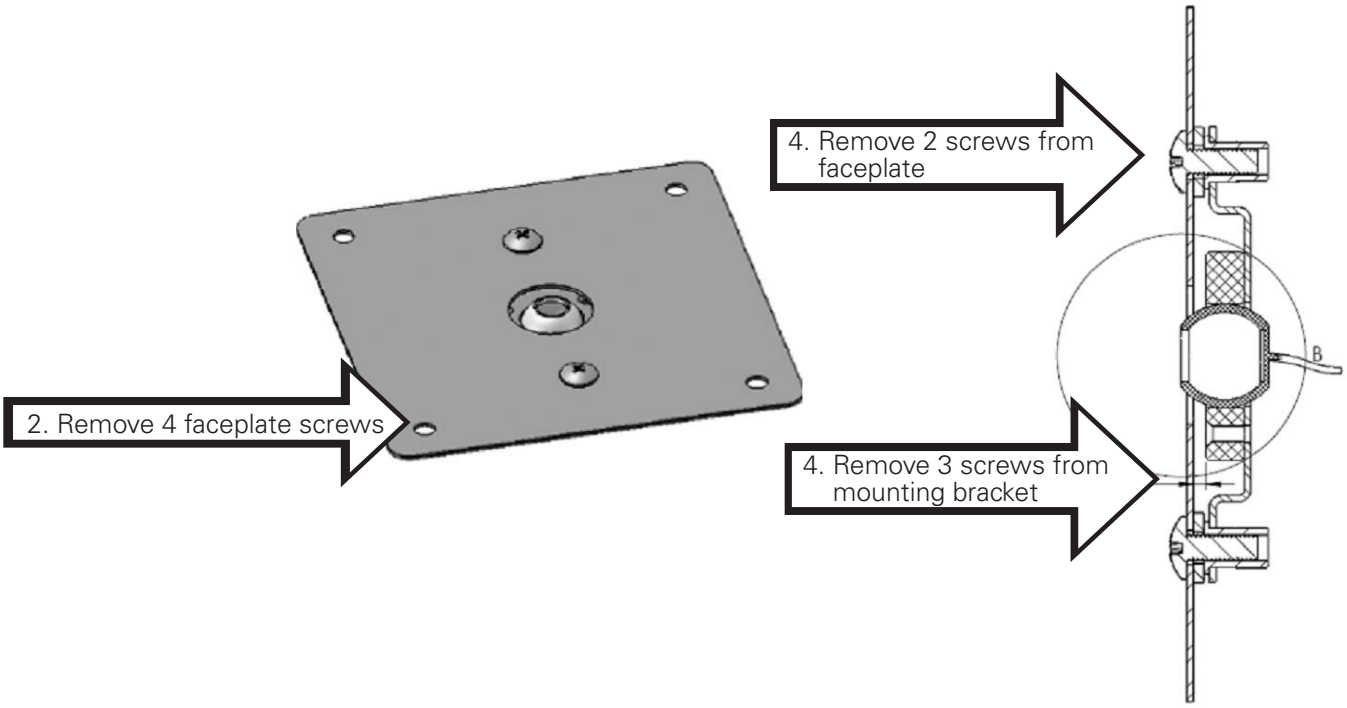
3. Gently move the IRIS™ sensor to position the laser beam point at the center of the cooking surface. ***NOTE:*** The actual field of view for most applications will be 60 degrees.

4. Remove the Laser Alignment Tool.

IRIS™ Sensor Removal/Replacement

To remove the IRIS™ Sensor, follow these steps:

1. *Disconnect the IRIS™ sensor from the terminal block located in the Capture Jet® hood. Refer to the terminal block diagram on the Halton-supplied wiring diagram for the correct terminations points.*
2. *Remove the face plate of the sensor by removing the 4 face plate screws.*
3. *Lift out the face plate and sensor and gently pull out the sensor wires.*
4. *Remove the sensor bracket from the face plate by removing the 2 screws on the faceplate.*
5. *Remove the sensor from the sensor bracket by removing the 3 screws.*
6. *Reverse the steps when replacing the IRIS™ sensor (Halton Part # 18037).*



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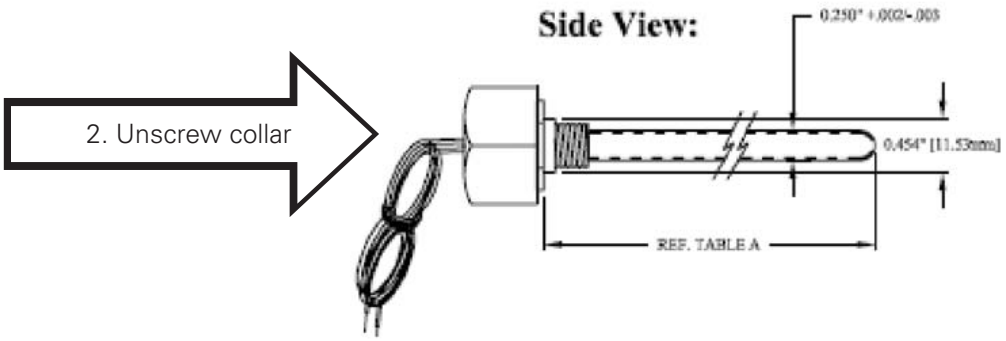
Temperature Sensor Removal/Replacement

To remove the temperature sensor located in the hood collar, follow these steps:

1. Disconnect the temperature sensor from the terminal block located in the Capture Jet® hood. Refer to the terminal block diagram on the Halton-supplied wiring diagram for the correct terminations points.
2. Unscrew the tightening collar on the temperature sensor.

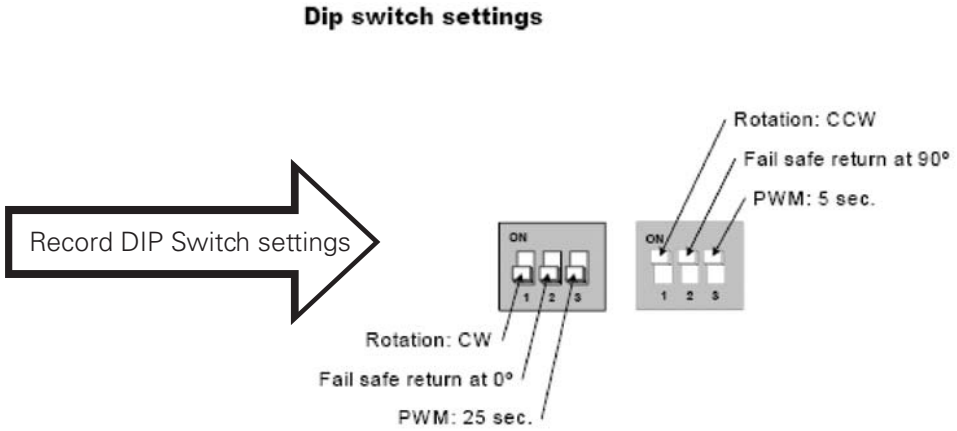


3. *Remove the temperature probe.*
4. *Replace the defective temperature probe with a replacement (Halton Part # 17641)*
5. *Reconnect wiring.*

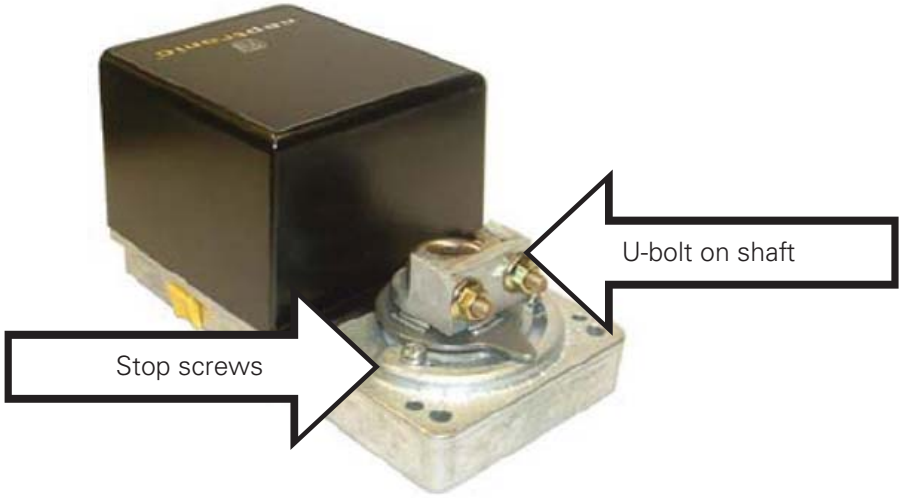
Balancing Damper Actuator Removal/Replacement

To remove and replace the actuator on the balancing damper, follow these steps:

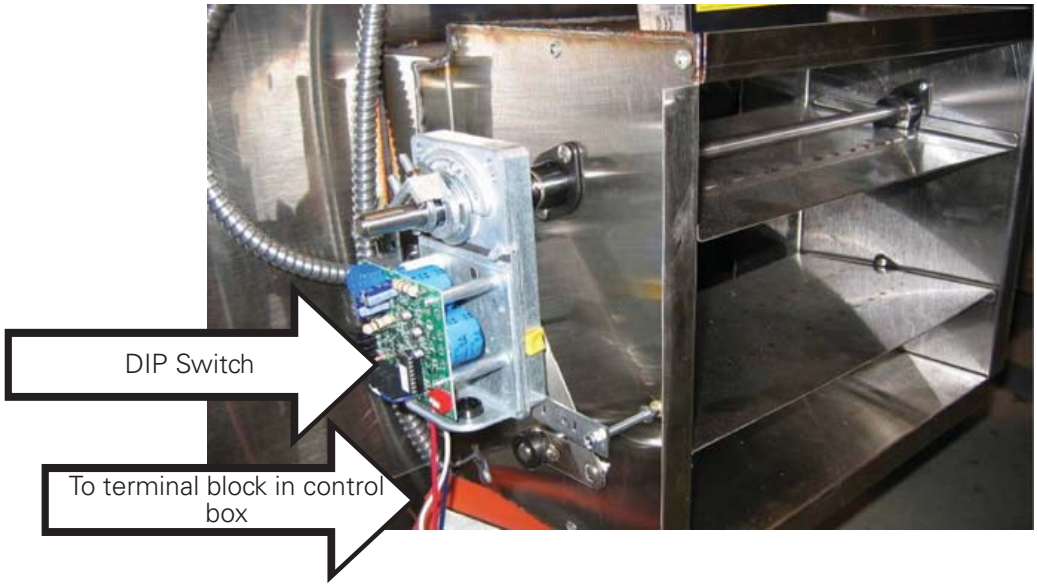
1. *Remove exterior metal cover by removing the 6 mounting screws around the perimeter.*
2. *Remove the actuator cover by removing the 1 screw on the side.*
3. *Disconnect the power to the actuator.*
4. *Record the DIP switch values, located in the red holder on the bottom of the actuator.*



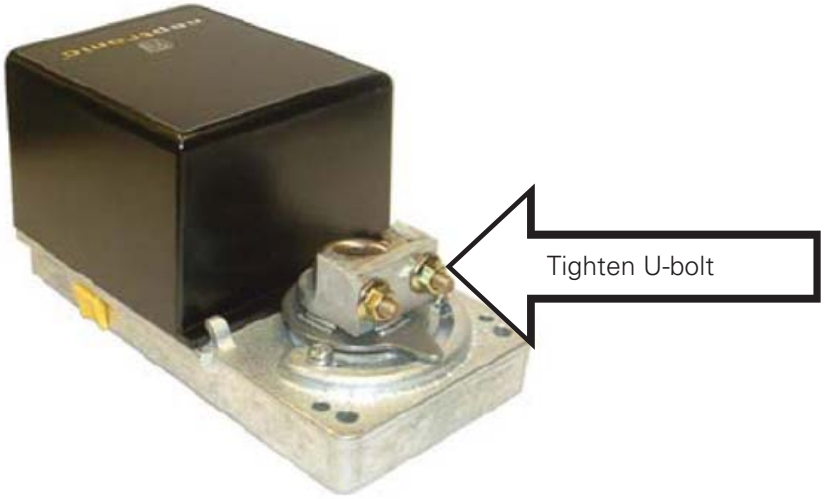
5. *Note the position of the stop screws.*



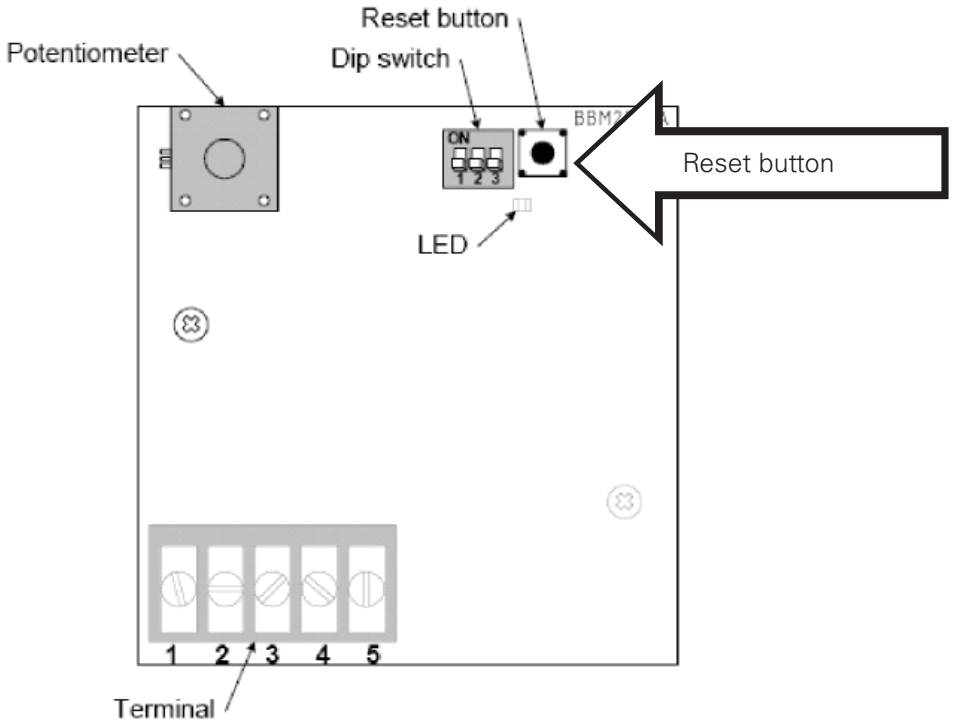
6. *Remove the U-bolt that attaches the actuator to the balancing damper shaft. Refer to the Actuator Specification and Installation instructions with the replacement part.*



7. *Replace with a replacement actuator (Halton Part # 16012). Tighten the U-bolt on the drive shaft.*



8. *Reset the DIP switches.*
9. *Reset the stop screws.*
10. *Reconnect the power.*
11. *Calibrate the new actuator by pressing the* ***Reset*** *button. The dampers will open and close.*



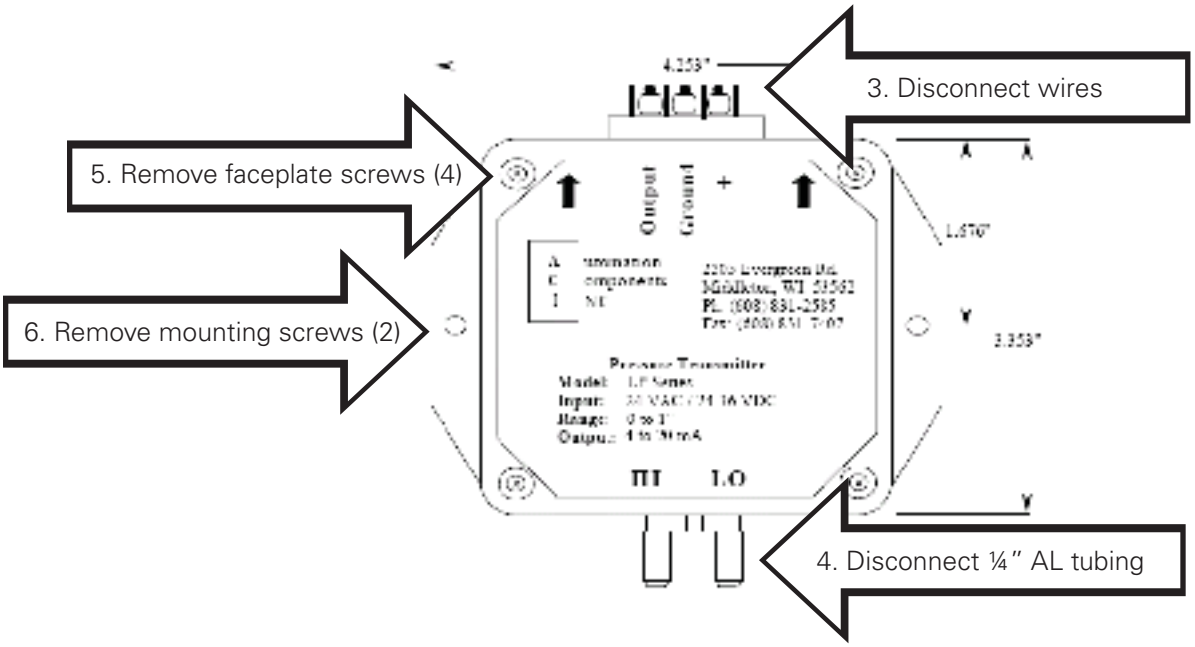
12. *Replace the actuator housing and the exterior metal cover as before.*

Balancing Damper Actuator Removal/Replacement

To remove the pressure transducer, follow these steps:

1. *Turn off power to transducer.*
2. *Remove covering on pressure transducer mounting bracket.*
3. *Disconnect wires.*
4. *Disconnect ¼" aluminum tubing fitting*

5. *Remove pressure transducer faceplate (4 screws).*
6. *Remove side mount screws (2 screws).*
7. *Replace with Halton Part # 18028).*
8. *Reconnect wires and tubing as before. Check that the tubing is not kinked.*



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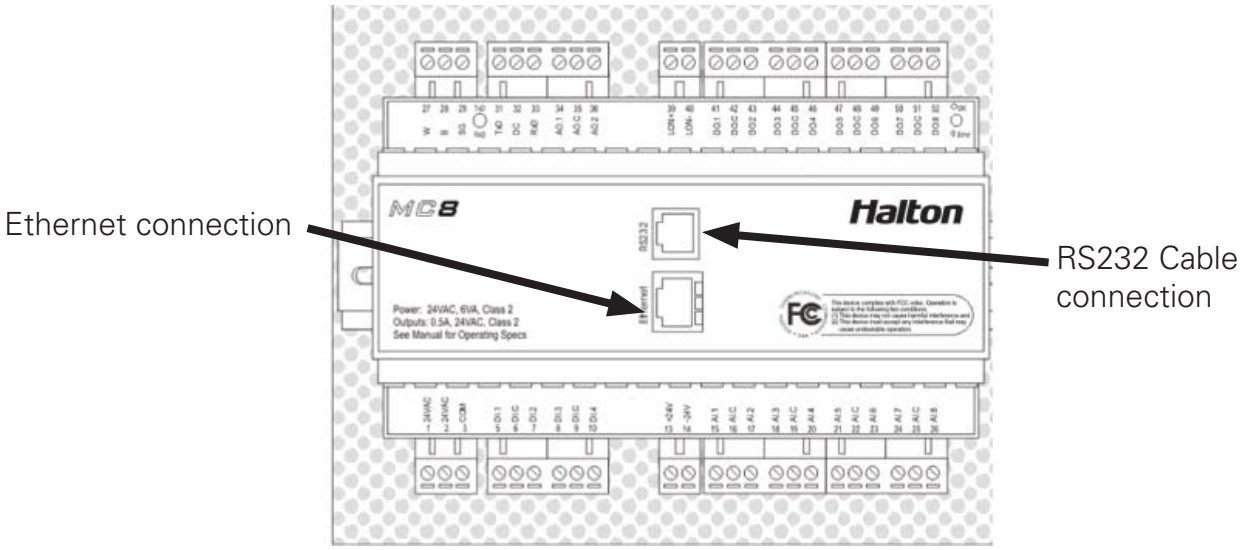
M.A.R.V.E.L. System Monitoring and Support

Types of Monitoring



Type of Mounting	Details
Permanent Ethernet-connection for 24/7 monitoring	• Optional. • Permanent internet monitoring using SCADA graphical interface. • By using a unique password and ID, user can check system status and, depending on access levels, change parameters and alarms.
Temporary Ethernet connection, as required, for support	• Temporary Ethernet connection for startup/ troubleshooting by Halton Technical Support only
Temporary cable to laptop connection, as required, for support	• RS232 cable connection to laptop pre loaded with KONSOLE™ software for diagnostic support.

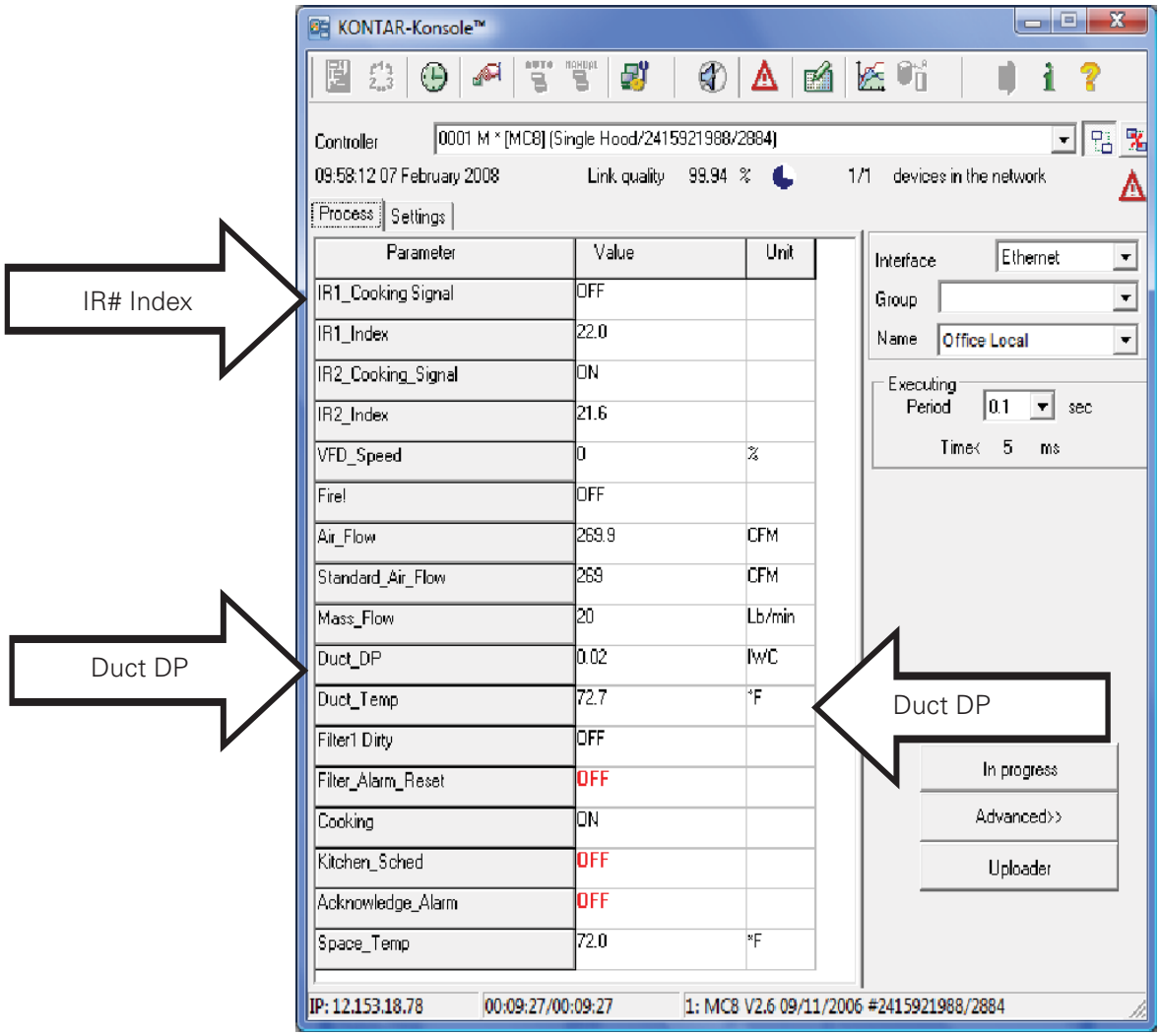
KONTAR-Konsole™ Software

The KONTAR-Konsole™ Commissioning and Diagnostic Software Interface displays set operating parameters and actual values. When accessed and reviewed by a trained Halton technician, support and troubleshooting can be offered.

NOTE: Only Halton- trained technicians should access this software.

For additional details and support with KONTAR-Konsole™ software, use the on-line help from the toolbar.

For example:



Display Field	Recommended Value and Action
IR1_Index IR2_Index, etc	• Appliance OFF - 59 - 80 °F • Appliance ON: > 80 °F • Power supply off: -220 °F ***NOTE:*** if more than 1 IRIS™ sensor, check each IR_Index value. If all values are -220 check that power supply.
Duct_DP	• Exhaust fan OFF: 0.00 IWC • Exhaust fan ON: up to 1 IWC (single unit) • Exhaust fan ON: up to 3 IWC (multiple units with common duct)
Duct_Temp	• Cooking: 50 to 150 °F • Not cooking: ambient room temperature

FAQ's (Frequently Asked Questions)

Problem	Probable Cause	Solution
Laser on Alignment Tool does not work	Battery low	Replace battery. Unscrew end of tool, remove the battery and replace with same type.
Exhaust damper blades do not open or close	Loose set screws	Tighten
	In-operable motor	Replace
No suction at hood	VFD tripped	Check for error code, reset
	Surface and duct temperature sensors not activated	Push override button

M.A.R.V.E.L. Parts List

The following is the recommended parts list for proper care and maintenance of the M.A.R.V.E.L. equipment. Parts indicated with a * should be kept readily on hand, the amount depending on the number of hoods in the system.

NOTE: Contact Halton for information on other replacement parts as required

Part	Halton Part Number
Pressure transducer* (for each hood)	18081
Pressure transducer* (for common duct for multiple units only)	18045
Temperature sensor*	18024
IRIS™ sensor*	18037
Actuator* (for balancing damper) (optional)	16012
MC8 Controller (optional)	18035

M.A.R.V.E.L. Parts List

United States	Halton Company 101 Industrial Drive Scottsville, Kentucky 42164 www.haltoncompany.com	**Tel:** 270-237-5600 **Toll Free:** 800-442-5866 **Fax:** 270-237-5700
Canada	Halton Indoor Climate Systems 1021 Brevik Place Mississauga, Ontario L4W 3R7 www.haltoncanada.com	**Tel:** 905-624-0301 **Toll Free:** 800-565-2981 **Fax:** 905-624-5547

HALTON LIMITED WARRANTY

Halton ("Manufacturer"). Warrants only to its direct purchasers and to no others, that all products manufactured by the Manufacturer shall be free from defect in materials and workmanship for a period of twelve (12) months from the date of the original installation and start-up or eighteen (18) months from date of shipment, whichever occurs first. All products sold but not manufactured by Manufacturer will be warranted for a period of twelve (12) months from date of shipment.

For products manufactured by the Manufacturer we agree to pay any reasonable labor costs necessary to repair or replace, at Manufacturers option, defective parts or materials for a period of twelve (12) months from date of original installation and start-up or eighteen (18) months from date of shipment, whichever occurs first. All labor costs subject hereto shall be performed during standard work hours at straight-time rates.

For products sold but not manufactured by the Manufacturer we agree to pay any reasonable labor costs necessary to repair or replace, at Manufacturers option, defective parts or materials for a period of (90) days from date of original installation and start-up or (12) months from date of shipment, whichever occurs first. All labor costs subject hereto shall be performed during standard work hours at straight-time rates.

Purchaser shall pay incurred premium labor charge, including overtime, weekends and holidays. Travel time, service charges, miscellaneous tools, material charges, and labor charges resulting from inaccessibility of equipment will not be paid by Manufacturer.

This LIMITED WARRANTY SHALL APPLY ONLY to products that have been installed and maintained in accordance with the installation and Care Instruction Manuals. Purchaser shall be solely responsible for adhering to the instructions and procedures set forth in the said instruction manuals.

This LIMITED WARRANTY SHALL NOT BE APPLICABLE to any damage or defect resulting from fire, flood, freezing or any Act of God, abuse, misuse, accident, neglect or failure to adhere to all instructions set forth in the installation and Care Instruction Manuals. Furthermore, this limited warranty shall not apply to any product that has been altered, unless such alteration has been approved in writing by a duly authorized representative of the manufacturer. In no event shall the manufacturer be liable for any loss, expense, personal injury or consequential damage, of any kind or character, as may result from a defect in material, and/or workmanship, however caused.

EXCEPT AS IS EXPRESSLY SET FORTH IN THIS LIMITED WARRANTY, MANUFACTURER MAKES NO WARRANTY OF MARKETABILITY FOR FITNESS OR ANY PARTICULAR PURPOSE. NEITHER DOES MANUFACTURER MAKE ANY WARRANTY, EXPRESSED OR IMPLIED, WITH RESPECT TO PRODUCTS SOLD BY MANUFACTURER OR AS TO THE USE THEREOF.

Halton Company
101 Industrial Drive, Scottsville, 42164 USA
Tel: 270-237-5600 Fax: 270-237-5700
Website address www.haltoncompany.com

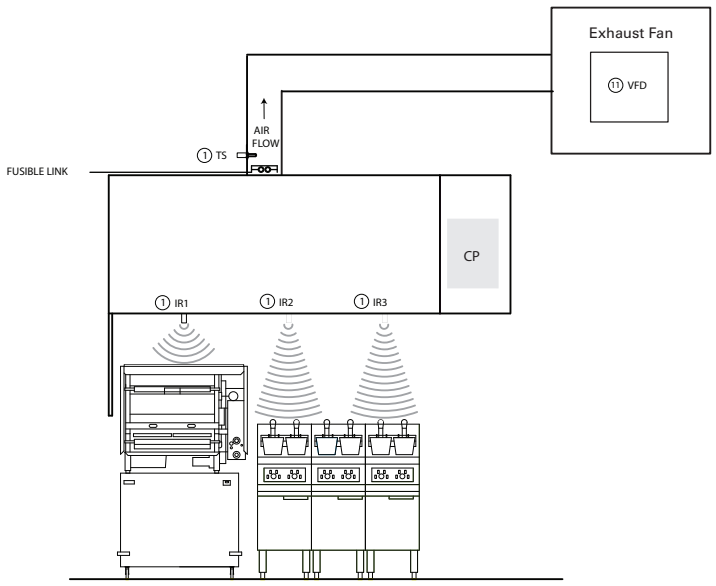
Halton Indoor Climate Systems, Ltd.
1021 Brevik Place • Mississauga, ON L4W 3R7 CANADA
Tel: 905-624-0301 Fax: 905-624-5547
Website address www.haltoncanada.com

Halton
CARE FOR INDOOR AIR

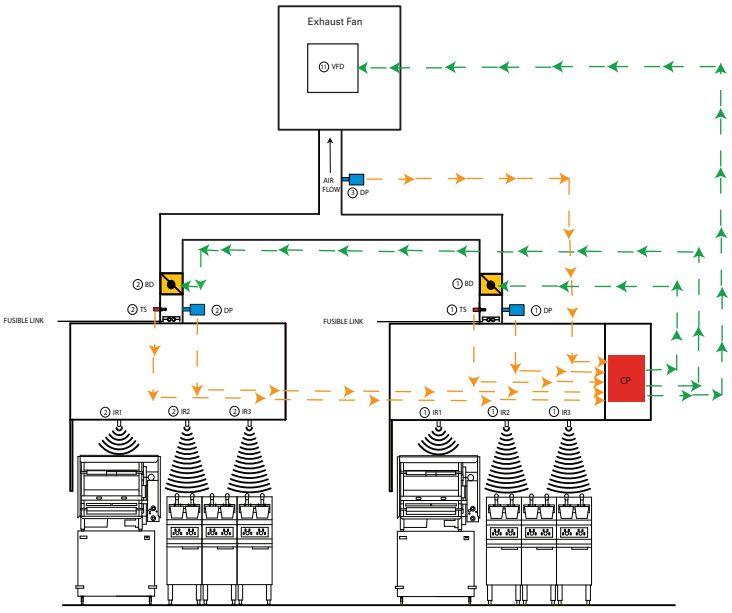
Model M.A.R.V.E.L.

Model based Automated Regulation of Ventilation Exhaust Levels

SINGLE HOOD SYSTEM



MULTIPLE HOOD SYSTEM



Continuous improvement is a Halton policy, therefore specifications and designs are subject to change without notice.

Features:

- Minimizes use of outside air when heating or cooling is required.
- Adjusts hood exhaust airflow depending on appliance status.
- Kitchen exhaust fans will automatically start when appliances are switched on and stop as soon as cooking appliances cool down. Manual or on schedule start/stop are also available.
- System automatically detects and sends warning signal if exhaust hood is operated without a filter or filters are clogged and need to be cleaned.

Specification

Halton M.A.R.V.E.L. system to come equipped with hood mounted infrared cooking activity sensors capable of measuring appliance surface temperatures. Infrared sensor will read appliance surface temperature which will be translated by the specific calculation algorithm for that appliance and will respond proactively to any change in cooking status. Infrared sensor and exhaust collar mounted temperature sensor work in concert on differential temperature reading back to the controller.

System to also come equipped with utility cabinet and VFD(s) to control fan speeds. The M.A.R.V.E.L. system shall automatically control the speed of the exhaust fan (and supply fan if applicable) based on appliances status, cooking activities and exhaust air temperatures.

The system can be controlled with either manual On/Off switch, a 24hrs automated schedule with a manual override function, or the hoods can be automatically regulated based on the appliance status. The integrated PLC will analyze signals from the cooking activity sensors, temperature sensors and pressure transducers mounted in the hood and then send a signal to the VFD to adjust the exhaust fan (and supply fan if applicable) speed to satisfy current cooking load conditions. The system can be monitored and controlled with an internet connected PC from either a local or remote location. .

Division 16 will be responsible for wiring between the supplied Halton M.A.R.V.E.L. control panel and the hood mounted sensors. Division 16 will also be responsible for wiring between the Halton M.A.R.V.E.L. control panel and the VFD's and then from the VFD's to the exhaust/supply fan motors. Halton to provide inter-connectivity cables between the hoods and associated control panels. Halton to provide room temperature sensor. Electrician to provide labor to run cables and required control power per submittal drawings.

Field start-up to be performed by Halton Authorized Service Agency

A duct mounted temperature sensor only system will not be permitted. A duct mounted temperature sensor in conjunction with a smoke detector will not be permitted.

M.A.R.V.E.L. - Model base Automated Regulation of Ventilation Exhaust Levels

Halton
CARE FOR INDOOR AIR

Halton Company
101 Industrial Drive, Scottsville, KY 42164 USA
Tel: 270 237 5600 • Fax: 270 237 5700
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1021 Brevik Place, Mississauga, ON L4W 3R7 Canada
Tel: 905 624 0301 • Fax: 905 624 5547
Website: www.haltoncanada.com

APPENDIX E –BUILDING CODE REQUIREMENTS FOR TENANT OCCUPANCIES

Calgary International Airport
Air terminal Building

Building Code Requirements
For Tenant Occupancies

The following excerpts and interpretations from the Alberta Building Code 2014 are included as a quick reference for your information only; they do not supercede the Alberta Building Code 2014. It is the responsibility of the tenant, or the tenant's design professional, to read and ensure compliance with the Alberta Building Code 2014 and all other Codes application to your specific project.

1.0 FIRE SEPARATION REQUIREMENTS

1.1 Extracts from the ABC 2014

Between Adjoining Major Occupancies:

3.1.3.1.(1) Except as permitted by Sentences (2) and (3), major occupancies shall be separated from adjoining major occupancies by fire separations having fire-resistance ratings confirming to Table 3.1.3.1.

Major Occupancy	Minimum Fire-Resistance Rating of Fire Separation, h Adjoining Major Occupancy			
	A-2	D	E	F-3
A-2	-	1[4]	2	1
D	1[4]	-	-	-
E	2	-	-	-
F-3	1	-	-	-

Notes to Table 3.1.3.1

(1) Section 3.3 contains requirements for the separation of occupancies and tenancies that are in addition to the requirements for the separation of major occupancies.

(4) Where the building is constructed in accordance with Article 3.2.2.58., a fire separation with a 2 h fire-resistance rating is required between the Group D and Group A, Division 2 major occupancies.

Separation of Suites:

3.3.1.1(1) Except as permitted by Sentences (2) and (3), each suite in other than business and personal services occupancies shall be separated from adjoining suites by a fire separation having a fire-resistance rating not less than 1 hour. (Refer to ABC 2014 for full Clause)

3.3.1.1.(3) Occupancies that are served by public corridors confirming to Clause 3.3.1.4.(4)(b) in a building that is sprinklered throughout, are not required to be separated from one another by fire separations provided the occupancies are:

a) suites of business and personal services occupancy,

b) fast food vending operations that do not provide seating for customers,

c) suites of mercantile occupancy, or

d) any combination of these occupancies.

Between Public Corridors and Rooms or Suites:

3.3.1.4.(2) Except as permitted by Sentence (3) and Clauses (4)(a) and (b), the fire separation between a public corridor and the remainder of the storey shall have a fire-resistance rating not less that 45 minutes.

3.3.1.4(3) If a storey is sprinklered throughout, no fire-resistance rating is required for a fire separation between a public corridor and the remainder of the storey, provided the corridor does not serve a care, treatment or detention occupancy or a residential occupancy.

3.3.1.4(4) No fire separation is required in a sprinklered floor area between a public corridor and:

a) except as required by Sentences 3.3.3.5.(9) abd 3.3.4.2.(1), and notwithstanding Sentence 3.4.2.4.(2), the remainder of a storey, provided the travel distance from any part of the floor area to an exit is not more than 45m,

b) a room or a suite, provided the public corridor complies with Sentence 3.3.1.9.(6) and Clause 3.4.2.5.(1)(d), or

c) a space containing plumbing fixtures required by Subsection 3.7.2., provided the space and the public corridor are separated from the remainder of the storey by a fire separation having a fire-resistance rating not less than that required between the public corridor and the remainder of the storey.

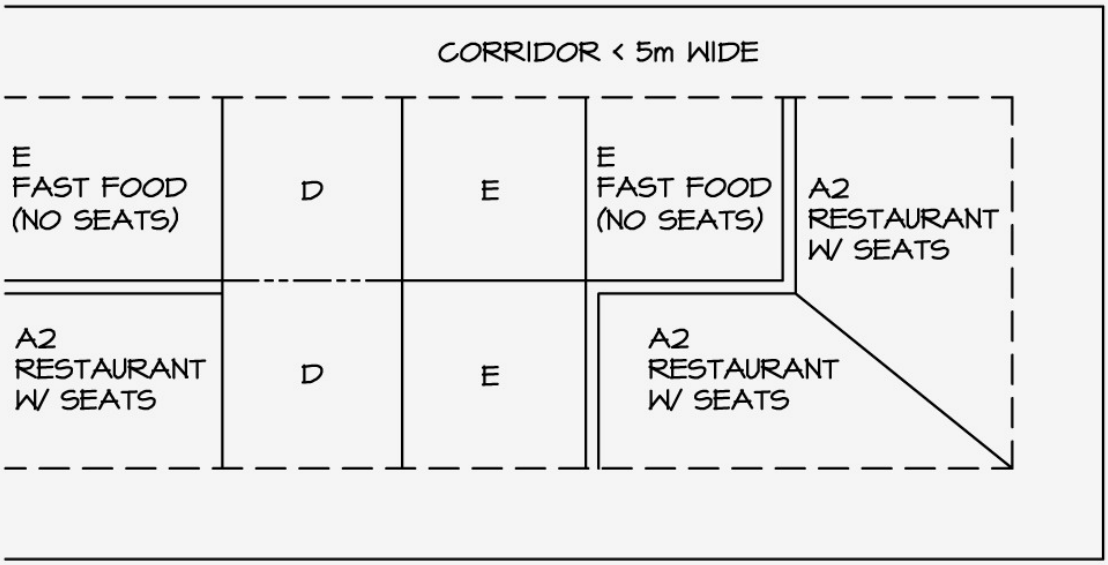


FIGURE 1a

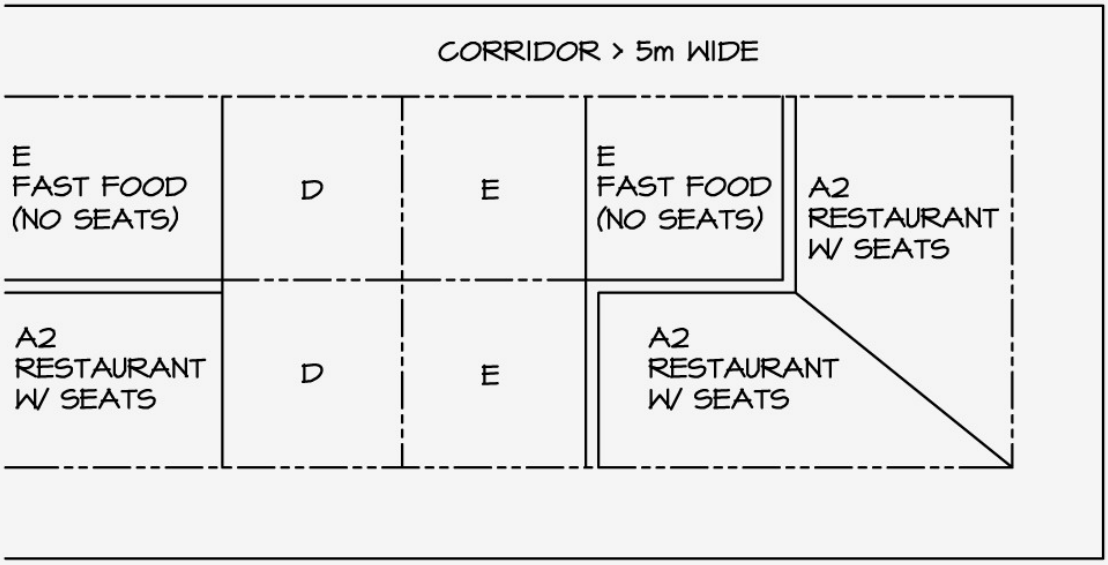
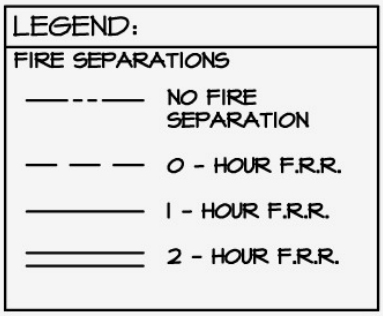


FIGURE 1b



2.0 REQUIREMENTS FOR NUMBER AND LOCATION OF MEANS OF EGRESS

2.1 Requirements from the ABC 2014

The following summarizes the ABC 2014 requirements for the number of egress routes and the travel distance to an exit from rooms and suites within the Calgary International Airport; Air Terminal Building (provided the floor area is sprinklered):

3.3.1.5(1) Number of Egress Doors From Suites: Two egress doors are required where any room or suite exceeds the following floor area:

A 200 m2

D 300 m2

E 200 m2

F3 .....300 m2

3.4.2.1(1) Maximum Travel Distance Within Rooms or Suites to an Egress Door:

Where suites require only one egress door.....25 meters

Where suites require 2 egress doors.....45 meters

3.4.2.4.(2) and 3.4.2.5.(1) Maximum Travel Distance From Rooms or Suites to an Exit: The maximum travel distance from the egress door of a room or suite to an exit is 45 meters, in a floor area that contains an occupancy other than high-hazard industrial occupancy, provided it is sprinklered throughout. Where there is no fire separation between the room or suite and the surrounding floor area, the travel distance means the distance from any point in the floor area to an exit measured along the path of travel to the exit.

APPENDIX F – YYC BUILDING COMMUNICATIONS SYSTEMS AND CABLING POLICY, PROCEDURES & STANDARDS

CAA BUILDING COMMUNICATION SYSTEMS AND CABLING POLICY, PROCEDURES & STANDARDS

Date Issued: **March 1, 2016**

Updated: **February 26, 2016**

Airport Authority Contact: **General Manager, I.T. Services**

TABLE OF CONTENTS

1 Introduction

This document is intended to provide infrastructure cabling guidelines for the implementation of communication systems at The Calgary International Airport. This document highlights the standards that tenants and their contractors, and Calgary Airport Authority contractors must follow.

This document contains policy, procedures, standards and installation practice guidelines. It shall be provided to contractors doing work on behalf of the tenants and the Calgary Airport Authority.

The intent of this document is to assist tenants and their contractors to include the technical and infrastructure requirements in their planning and project development process. By incorporating these standards into the CIP submission, The Calgary Airport Authority will be able to process tenant requests quickly.

As part of the Construction Installation Permit (CIP) process, all documentation must be submitted to the YYC Development Coordinator – Planning and Engineering - for review and approval by The Calgary Airport Authority.

The Calgary Airport Authority will review these guidelines on an annual basis for technical relevance and conformance with the Calgary International Airport evolving applications requirements.

This document addressed as the inside plant communications distribution system design as it relates to:

- Cabling – backbone and horizontal
- Cabling Pathway.
- Communications Equipment Room.
- Testing.

2 Abbreviations

Authority or CAA	The Calgary Airport Authority
BICSI	Building Industry Consulting Service International
CER	Communications Equipment Room
CIA	Calgary International Airport - (the Airport)
CIP	Construction Installation Permit
EIA	Electronic Industries Alliance
TIA	Telecommunications Industry Association
ITOS	IT Operational Systems
TSR	ITOS Telecom Service Request

3 Definitions

The Calgary Airport Authority – referred to as the Authority

Tenant – a person/company that has obtained a lease agreement from the Authority in which to conduct business:

- Tenant Lease Area – area that the tenant has leased from the Authority,
- Tenant Contractor – The person/company that the Tenant has engaged to do work within the tenant lease area,
- Common Use area - all area outside of the tenant lease area that is not currently under or available for a future lease agreement.
- ISP – Inside Plant Cabling
- FACTS – Fiber and Copper Tracking System
- SCN – Shared Communication Network
- CER – Communications Equipment Room
- ITB – International Terminal Building (NEW)
- DTB – Domestic Terminal Building

4 Reference Materials

Work performed must conform to the following standards including all addendums: (Where guidelines in two standards differ, the most stringent shall apply).

Note: The most recent issue / addendum of the standards listed below or the future published standards at time of CIP application shall be used:

- TIA-607-xx: Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises
- ANSI/TIA-606-x: Administration Standard for Telecommunications Infrastructure
- TIA-569-xx: Telecommunications Pathways and Spaces Addendum 1- Revised Temperature and Humidity Requirements for Telecommunications Spaces
- ANSI/TIA-568-C.0-x: Generic Telecommunications Cabling for Customer Premises- Addendum 2
- TIA-568-C.1-x: Commercial Building Telecommunications Cabling Standard,
- ANSI/TIA 568-C.2-x: Balanced Twisted Pair Telecommunications Cabling and Components Standard,
- ANSI/TIA-568-C.3-x: Optical Fiber Cabling Component Standard
- TIA-758-B (April 2012): Customer-Owned Outside Plant Telecommunications Infrastructure Standard
- CSA C23.1-12 (23nd Edition) – Canadian Electrical Code Part 1,

- CSA C22.2 No. 214-08 (R2013) – Communications cables (Bi-national standard, with UL 444)
- CSA C22.2 No 232-M – Optical Fiber Cables,
- CSA ISO/IES 11801-4th Edition (March 2012) – Information Technology – Generic Cabling for Customer Premises,
- CANELEC EN 50173 – Information Technology – Generic Cabling Systems,
- TIA-526-14-B (October 2010): Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
- TIA-527-7-2 (December 2008): OFSTP-7 Measurement of Optical Power Loss of Installed Single-mode Fiber Cable Plant
- ANSI/EIA/TIA-492AAAA-B (November 2009): – Detailed Specifications for 62.5µm Core Diameter/125µm Cladding Diameter Class 1A Multimode, Graded-Index Optical Fibers,
- ANSI/EIA/TIA-492AAAB-A (November 2009): – Detailed Specifications for 50µm Core Diameter/125µm Cladding Diameter Class 1A Multimode, Graded-Index Optical Fibers,
- ANSI/TIA-492AAAC-B (November 2009): Detail Specification for 850-nm Laser-Optimized, 50-µm Core Diameter/125-µm Cladding Diameter Class 1a Graded-Index Multimode Optical Fibers
- TIA-598-C (January 2005): Optical Fiber Cabling Coding TIA-604-3-B (August 2004):
- FOCIS3 - Fiber Optic Connector Intermateability Standard, ANSI/TIA-942-A-1 (March 2013): Telecommunications Infrastructure Standard for Data Centers,

Where applicable to the project, the following materials with latest edition / revision number shall be available for reference while performing work:

- BICSI Telecommunications Distribution Methods Manual (TDMM),
- BICSI Outside Plant Design Reference Manual (OSPDRM),
- BICSI Wireless Design Reference Manual (WDRM),
- BICSI Network Design Reference Manual (NDRM),
- BICSI Information Transport Systems Installation Methods Manual (ITSIMM),
- CommScope Catalogue and Reference Guide (**Appendix-B**),
- The Calgary Airport Authority Planning and Engineering Air Terminal Building Technical Standards.

5 Infrastructure Overview

The Authority has a Fiber Optic and Copper network throughout the terminal with the fiber network extending to various parts of the airfield. The fiber network will be used by the Authority and the tenants as agreed to between the parties.

The following documentation highlights the requirements for telecommunications design and cabling installation. The Calgary Airport Authority has implemented CommScope Cabling System and requires tenants to take this into account when implementing systems within the airport. The CommScope Cabling System will be enforced for all fiber and copper runs that are implemented on Airport Authority property. The only exception to this is the voice copper cable backbone structure discussed later in this document.

Any requirement related to building modifications including coring, and sleeving, must be reviewed and approved through the CIP process.

Additionally, various Telecommunication Carriers, under license with the Authority, provide facilities and services on Airport property. Tenants will deal directly with these carriers for the services they provide. The Authority will work with Tenants and Carriers to facilitate services on airport property.

Any questions regarding this document or standards should be forwarded to the General Manager –IT Services or appointed representative.

6 General Requirements (Common-Use Area)

6.1 Certification and Applications Assurance

.1 As the new Fiber backbone is a CommScope certified system, all work being performed on the YYC Campus must be done in a manner that will conform to CommScope Systimax Cabling System Design Methodology. All base building copper and fiber cabling work is to be done by the contracted CAA CommScope Certified System Integrator using CommScope certified technicians.

.2 Currently Unified Systems Group is the only YYC approved Data contractor.

.3 All materials are to be CommScope or approved by CommScope to be a part of the CommScope Certified Structured Cabling System. Any exceptions must be pre-approved by the YYC General Manager of IT services or appointed representative. All associated warranties as offered by CommScope will be applied to the work performed. All expansion to the fiber backbone will be performed by the Authority or contractor approved by the authority. Horizontal cabling will be the responsibility of the tenant and must follow the CommScope Systimax requirements for certification.

.4 Horizontal copper cabling within the Authority's Campus must be installed to CommScope Systimax Structured Cabling System Guidelines. All indoor cable must be CMP (FT6) rated to meet Alberta Building and CEC code requirements. Cable specifications are included later in this document.

.5 All installed copper and fiber components are to carry the CommScope 25 year warranty and applications assurance.

.6 A copy of CommScope certification certificate should be provided with the test results and as-built drawings within 30 days of any project completion.

6.2 YYC Approved Contractor Credentials

.1 Technicians installing structured cabling shall be CommScope Certified staff that has been trained by CommScope on the installation of the products used. Proof of technician certification may be requested.

.2 At least one member of the staff must be trained by CommScope on the design, engineering and installation guidelines.

.3 At least one member of the staff must be a certified BICSI RCDD.

.4 A copy of CommScope certification certificate and applications assurance should be provided with the test results and as-built drawings within 30 days of any project completion.

.5 All CommScope installers and designers shall have current CommScope manufacturer training within three years of the project start date.

6.3 Security

.1 Tenants and contractors must comply with all security orders, regulations and procedures, as established by the Authority.

.2 Tenants and contractors must comply with all requirements of the Aerodrome Restricted Area Pass System and the CATSA Restricted Area Identification Card (RAIC) program. This policy has been enacted to provide positive identification of persons authorized to be in restricted areas on a "need and right to entry basis". On establishing a need and right of entry to an airport-restricted area, a pass may be issued authorizing access to specific area within the airport. All access requirements shall be identified in the initial CIP submission prior to the start of the project.

6.4 Hours of Work

.1 Hours of work are flexible but must be noted in the CIP. It is required that work on the airfield be coordinated with an CAA IT Services Coordinator.

.2 Any potential or actual impact on the existing Authority Cable Plant in terms of disruptions to general services must be reported to an CAA IT Services Coordinator for approvals prior to commencing work.

.3 Any anticipated noise of high levels and long duration or public safety issues must be approved by the Authority before the work is undertaken.

6.5 Cleanup

.1 All debris from the work site must be cleaned daily.

.2 All equipment and ladders must be removed from the com rooms at the conclusion of every work order.

.3 Any tracking of mud, dust, debris, etc. through the Air Terminal Building that result from the construction must be immediately cleaned.

.4 Proper barriers or dust collecting units must be used if the work will result in a proliferation of dust.

.5 Replacement of ceiling tiles, insulation board, paralline ceiling, etc., must be immediately put back after completion of work, or in the interim if work is delayed or postponed for short periods of time. This includes the raceways along the outer perimeter bulkhead and north terminal wall.

.6 Contractors/tenants must leave any work site in a neat and clean condition. If cleanup is required as a result of the contractor and not completed by the contractor, the cost of cleaning will be deducted from the contractors invoice. Contractors and tenants are responsible for reporting comm room non-conformance (per YYC Checklist mounted next to each comm room door) within 24 hours of work commencement.

6.6 Communications Equipment Room (CER) Access

.1 All work to be performed in CER's must be coordinated with the CAA IT Services Coordinator.

.2 Rooms (CERs) are to be inspected before the commencement of work; any deficiencies (cleanliness, missing roof tiles etc.) are to be reported to the CAA IT Services Coordinator. Failure to report deficiencies prior to the start of work will result in the contractor being held responsible for all room deficiencies.

.3 Contractors are NOT permitted to store toolboxes, ladders or spare materials in any CER.

.4 The Authority assumes no liability for material, tools, tool boxes or ladders that are stored in CER's as they will be removed at the contractor's expense.

.5 Contractors have 1 day to remove all materials, tools, tool boxes or ladders once the project is complete. If items are left 2 days, they will be disposed of by the Authority.

.6 Upon completion of the project the contractor will have 2 weeks to address any deficiencies related to CER cleanup and restoration. If the deficiencies are still outstanding at the end of 2 weeks the costs associated with room cleanup and restoration will be deducted from the contractor invoice.

.7 No Food or drinks are allowed in the comm rooms under any circumstances.

6.7 Safety

.1 All rules and guidelines as specified by the Alberta Occupational Health and Safety Act, the Canadian Code Part II and all regulations pursuant to these acts must be adhered to on Authority work sites.

.2 Contractor safety briefing is required and must be part of the CIP.

.3 Proper construction barricades shall be placed around the site when in public or high traffic areas.

.4 Planning and Engineering must approve all barricades prior to commencing the project. Locations of the barricades must be determined with the Planning and Engineering Department or the Director of Safety or Duty Manager.

.5 No tools shall be left unattended at any time. Tools left unattended within secure areas will be confiscated. Arrange for storage for tools and materials if working in a public area. Obtain approval before power actuated tools are used. Ensure that the operator of this type of equipment is certified to use it.

.6 Any work done on areas more than 2.4 meters above the nearest permanent safe level must be utilizing personal fall protection gear, in compliance with Labor Canada and OH&S guidelines. We have cables and brackets installed in frequently used areas for this use.

.7 All materials delivered to the work site must be identified by size and weight, as there are restrictions in certain areas.

.8 NOTAMS (notice to airmen) are required for any work being done on airside areas.

6.8 Canadian Air Transport Security Authority (CATSA)

.1 Effective, Nov 4, 2004, the Canadian Air Transport Security Authority (CATSA) implemented a program for the random screening of non-passengers (NPS) at the Calgary International Airport.

.2 All personal that have access to restricted areas could be subject to screening.

.3 You are not permitted to bring a prohibited item into a restricted area (except the necessary tools of the trade). If a prohibited item is intercepted, you may either surrender the item to a Screening Officer or leave the restricted area immediately. If you chose to leave the restricted area with the prohibited item, the Authority will be notified. See the NPS-CATSA documentation regarding further details, available at the Authority Pass Control Office.

.4 All materials delivered to the work site must be identified by size and weight, as there are restrictions in certain areas.

6.9 Coring and Access Panels

.1 When coring concrete floors, X-ray is required for all holes, coring is to be done after hours, clean up must be done as work is ongoing, and the contractor will be responsible for damages to finished adjacent areas.

.2 Any requirement related to building modifications including coring, and sleeving, must be reviewed and approved through the CIP process.

.3 All coring applications must be pre-approved by the Authority.

.4 Authority fire stopping standards are to be followed for cored holes

.5 Areas proposed for development with solid ceilings where Authority base building cable tray exists are required to provide access hatches running parallel to the tray at fifteen (15) foot intervals and at each cable tray junction and corner. Access hatches are to mounted at a two foot offset from the tray and not directly beneath it.

6.10 Conduit Provision

.1 The telecommunications infrastructure provided to each tenant's lease line shall consist of minimum one empty 32mm conduit ($1^{1/4}$") run from the nearest CAA communications room cable tray system to the tenant's lease line closest, and one additional 32mm conduit (11/4") for base building communication cables. Ensure that the fill ratio is not exceeded beyond 40% in conduits.

.1 One conduit will contain minimum of three (3) CAT6A cables, one conduit for (1) Shaw coaxial cable and one spare conduit.

.2 If applicable, the tenant will be responsible for extending this conduit and cable to his termination equipment location if other than the electrical backboard.

.3 Basic service requirements in excess of this conduit must be negotiated with the Authority leasing personnel.

.4 Conduits shall be run from the nearest cable tray to the identified termination point within the tenant space.

.5 Provide a pull string in all conduits within the building. Provide a distance marked 1700 lb. mule tape in all conduit and cable tray runs between buildings, in duct banks or in tunnels.

6.11 Grounding

.1 All electronic equipment, racks, cabinets, tray, conduit and other equipment shall be grounded as per the applicable codes in use by the Authority. Approved Government and local codes shall take precedence over the requirements of this document.

.2 Grounding and bonding procedures outlined in TIA-607-B with latest addendum shall be strictly adhered to.

.3 All grounding requirements must be implemented to ensure personnel safety and equipment reliability. Industry-wide specifications, standards and applicable codes are required as a minimum and additional steps may be taken as required, based on system requirements and the site's geographical area.

.4 Abnormal and unusual conditions can sometimes require special effort to achieve an effectively bonded and grounded site.

.5 Provide grounding bus bar to all telecommunications rooms. The ground bus shall be tied into the building's low voltage grounding system.

.6 Utilize 2-hole compression type ground lugs for all connections to grounding bus bar and racks/cabinets.

.7 All racks, cabinets and horizontal communications pathways must be grounded using #6 AWG non insulated (minimum), stranded copper ground wires. Ensure that metal-to metal contact when grounding to paint or powder-coated surfaces.

.8 All racks, cabinets and horizontal communications pathways must be grounded to the ground bus-bar independently, not daisy chained.

7 Telecommunications Infrastructure Policies & Strategies

7.1 Terminal Building Common-Use Areas

.1 The Calgary Airport Authority will own, operate, and control all communications infrastructure within non-leased or common-use areas in the area defined as Domestic Terminal Building and International Terminal Building at the Calgary International Airport. The Authority shall ensure reasonable and competitive pricing for the usage of such infrastructure for all users.

.2 The Authority will provide this communications infrastructure from the Telecommunication Carrier's main distribution rack or switch (located in the Authority's Service Building) to each tenants lease line.

.3 The communications infrastructure shall be defined as: all fiber and copper cable, all conduit/raceways, termination equipment (non-tenant), racking and enclosures (non-tenant), active components and other telecommunications related facilities on Calgary Airport Authority property. This shared communications network (SCN) will be used as the backbone for voice, data, video, multimedia and special communications systems that are required for the ongoing operations and support of activities within the Terminal Buildings at the Calgary International Airport.

7.2 Air Terminal Building Tenant Lease Area

.1 As the tenant is responsible for the infrastructure with-in their own lease space, it is recommended that the tenant takes due diligence in designs and that all designs should be reviewed by a BICSI RCDD and/or P. Eng. to ensure adherence to the applicable standards. The design must be provided to the Authority, listing the products used by part number and

description. An explanation of the design must provide the location of the termination points, pathways, penetrations and capacities of the proposed cabling. The design shall conform to CommScope Structured Cabling System guidelines. All designs shall be submitted as per the CIP and TSR processes.

.2 The following tenant categories outline the amount of communications that should be placed into the tenant's demarcation point as part of the ITB construction process. These categories have been developed through consultation with Commercial Properties,

.3 All telecom and network services equipment must be accommodated within the tenant's communications room and rack. YYC Comm rooms will not be available for tenant equipment.

.4 The CAA will provide basic WiFi services within the tenant leased space. Tenant requirements are to be included in the CIP application.

.5 All required services (phone/Internet) to be provided by Public Carriers (Telus/Shaw/…)

8 Request to Perform Work

1. All contractors requested to perform work within the Calgary International Airport must have that work pre-approved by the Authority. All work must be performed within the guidelines of this document and the Terminal Building Technical Standards. Submissions for work are to be processed on a CIP (Construction Installation Permit) and an ITOS TSR (Telecom Service Request).

REFER TO YYC COMM ROOM STANDARDS DOCUMENT FOR ROOM SIZING AND CONSTRUCTION DETAILS. See Appendix A

8.1 Designs

.1 Due diligence is required in designs; it is highly recommended that all designs shall be reviewed by a BICSI RCDD and / or P. Eng. to ensure adherence to the applicable standards. The design must be provided to the Authority, listing the products used by part number and description, with the CIP submission.

.2 An explanation of the design must provide the location of the termination points, pathways, penetrations and capacities of the proposed cabling. The design shall conform to CommScope Structured Cabling System guidelines.

.3 All communications designs and drawings shall be provided with the CIP and TSR processes.

8.2 Drawing Submissions

.1 Drawing Submissions must include network schematics, equipment locations, and identify network protocols used. Submissions of drawings shall be in AutoCAD and PDF.

8.3 Format of Submissions

.1 Drawings should be uniform in size: approximately 614mm x 914mm (24" x 36" – A1) and should include the following information:

.1 Cable tray layout on cable tray line drawing, showing entire network system impacted by projects

.2 Numbers and type of cable pairs used, and of those made available

.3 Room numbers of associated communications rooms

.4 Network schematic showing equipment and location(s)

.5 Descriptions of equipment to be used at user's end

.6 Telephone number or circuit number

.7 Name of the service provider (i.e. TELUS, Allstream, Shaw, etc)

.2 In addition to the above, the drawings should indicate store location, configuration, name, and premises number on a key plan.

.3 These requirements are identified where the tenants system interfaces with the Airport Terminal Building backbone infrastructure.

8.4 Computer Equipment Room or Telecomm Closet Layout

.1 The contractor shall submit a plan and elevation drawing of the proposed terminations for any existing or new rooms affected by the work. The placement and quantity of all new terminations shall be indicated on the drawing as well as the path of the cables within the room. Any equipment whether permanently or temporarily placed in the closet shall have its location indicated on the drawing.

Any active equipment must be noted and specification sheets provided showing physical dimensions, heat dissipation (BTU/hr), maximum and expected current draw (amps, phase, and volts), weight, and indicating any special environmental conditions which are required. This is required to confirm base building power and cooling capacities are not being exceeded.

8.5 Cable

.1 The contractor shall submit a drawing showing all cable paths from origin to termination**.** The drawing shall indicate any new or existing conduits or trays used and penetrations made. Cable designations shall be indicated on the drawing.

8.6 Scope of Work

.1 The tenant/contractor must submit a written explanation of the planned work.

.1 This must include the number, capacity and type of cable being installed or altered. It must provide a description of the areas that the work will be taking place and any access required to Authority areas or tenant space. Any equipment brought on site such as back hoes, man lifts, and etc. that may pose a safety hazard must be listed.

.2 The submitted scope of work must provide the number of technicians involved in the work with an indication of planned start and finish dates.

.3 Approval for installation of RF devices must meet Authority Tenant Communication Standards, described in the CIP application and will still require Industry Canada Licensing. Licensing alone does not constitute approval for installation of RF equipment/systems at the Calgary International Airport.

9 Products

In general all materials used in the DTB Common Use area shall be CommScope manufactured or products approved by CommScope for use with CommScope Structured Cabling Systems. While there are many products produced by CommScope, the following are excerpts from the Authority Air Terminal Building Communication Systems and Cabling Standards for Contractors/Tenants. Please refer to **Appendix-B** for the recommended products and their part numbers.

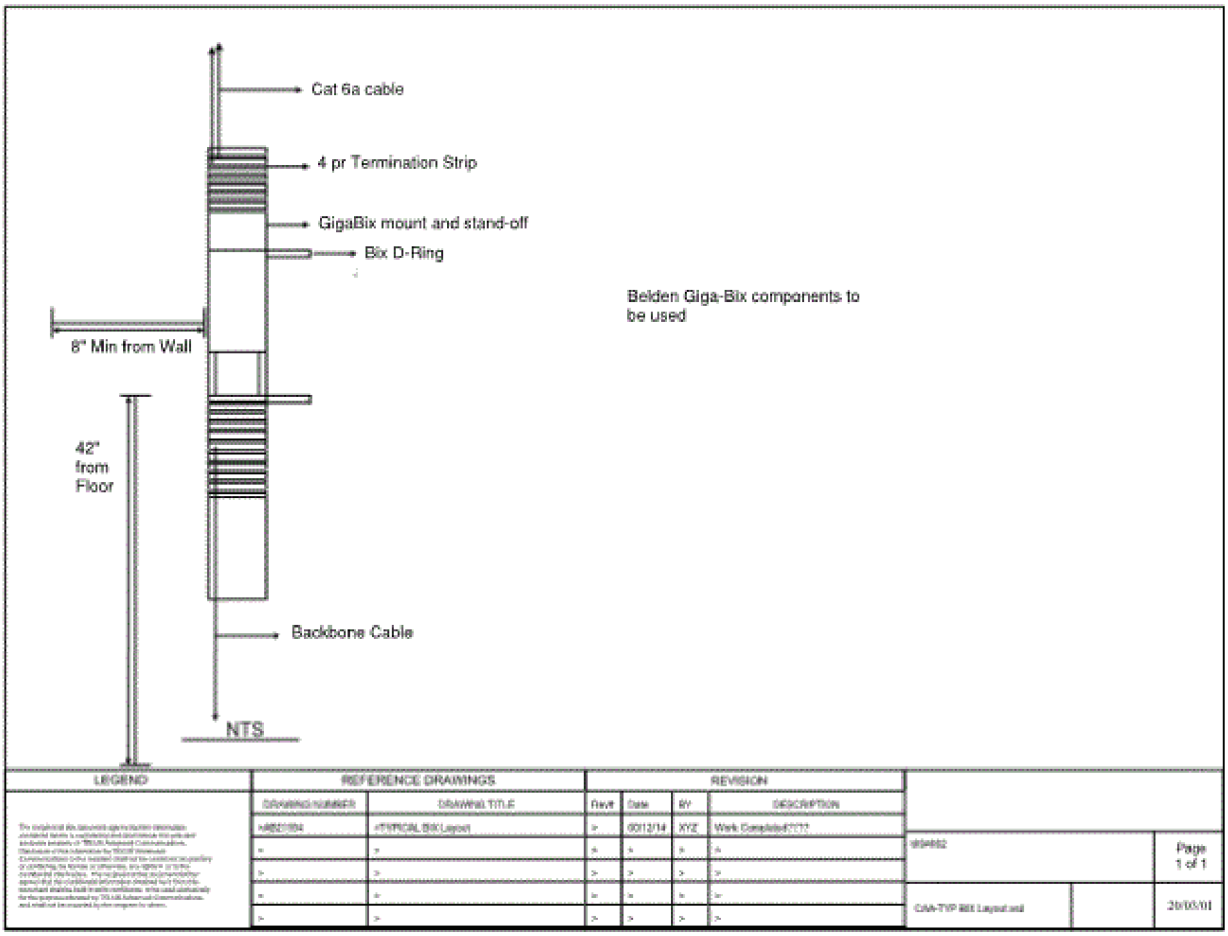
9.1 Voice

.1 Authority voice cable terminations are to be installed on Category 6 wall mounted GigaBix cross - connect products in the CER's.

.2 GigaBix layouts are to follow the standard Belden cross – connect design, where the horizontal distribution cables are on the top half of the termination field and backbone cables are mounted in the bottom termination field. This design facilitates vertical cross – connect jumpers in designated channels.

.3 At no time should a cross-connection be made within the same half of a field, but always top to bottom.

.4 Voice/phone requirements should be outlined in the CIP application.



GigaBIX connector strips shall be used for all 4 pair horizontal cabling designated as analog connections. GigaBIX connector strips shall also be used for all multipair backbone cable terminations.

9.2 UPS

.1 Any UPS requirement plugging into building generator must utilize online double conversion technology

.2 All UPS sizing to be confirmed by the YYC Electrical Manager or representing consultant

.3 All single phase UPS's are to be manufactured by Tripp-Lite and be registered with YYC IT once installed.

.4 All UPS devices are to be complete with Network interface connection for monitoring capabilities

.5 Tenant UPS requirements will be reviewed and accepted with the CIP process

9.3 Data

.1 All Authority fiber backbone is to be terminated in iPatch fiber panels using factory pre-terminated MPO Modules with LC connectors.

.2 The fiber backbone interconnecting the Data Center rooms and all satellite comm rooms shall terminate on CommScope fiber panels.

.1 The fiber panels are equipped with MPO/MTP Pre-terminated single-mode (OS2) cables. The MPO fiber OS2 cable uses plug-n-play technology with MPO/MTP pre-terminated connectors.

.2 The pre-terminated cassettes/modules are equipped with LC connectors to connect the required equipment using LC patch cords.

.3 The Authority data horizontal copper cabling terminates on the same racks as the fiber.

.1 The copper cables terminate on CommScope CAT6A angled IPatch Ready patch panels. There is a requirement for a 1U horizontal angled filler plate for every 48 ports provided.

.4 The Calgary Airport Authority horizontal distribution fiber or copper terminates on the same type of equipment and may use the same racks. Horizontal cables must always terminate on a separate panel and be mounted below the fiber panels in the rack.

.5 All like patch panels are to be mounted next to each other with no open spaces between.

9.4 Tenant Space

.1 All tenant cables, whether fiber or copper shall be installed to the same standards as required on all authority owned property.

.2 All tenant/concession spaces will be provided with their own telecommunication demarcation point as identified on the base building drawing. This Dmarc point will be located on a fire retardant plywood backboard. Mounted on this backboard will be a 4u x 19" rack with a 1u modular 24 port patch panel. Three Category 6a telecomm cables and one Shaw coax cable will terminate on this patch panel. There will be an integrated shelf on the rack to accommodate the tenant's internet router and/or network switch.

.3 There needs to be a clear differentiation between Authority cables and the tenant cables in the comm room, thus the tenant cables must not terminate on the Authority's rack unless the cables are being provided by the Authority as a point of demarcation.

.4 GigaBix fields will follow the manufactures standard installation design and will be used for all tenant cable terminations in the ITB comm rooms.

.1 All wall locations for GIGABIX mounting assemblies must be pre-approved by the Calgary Airport Authority.

.2 Tenants cables will be cross connected at intermediate comm rooms to authority trunk cables originating at the Telus Dmarc in the services building, room 203.

.5 Tenant equipment must be located within their leased space.

.1 Under no circumstances will a tenant, or a tenants contractor, connect to the Authority backbones unless pre-approved and under the direction of the Authority.

.2 All connections to the Authority backbone and equipment must be made by TELUS or USG under full disclosure to and with the direction of the Authority.

.3 All connections to any tenant equipment or patch panels are the responsibility of the tenant.

9.5 Rack and Cabinets

.1 All YYC cabinets must be secured in an access controlled Comm Room. All exceptions must be pre-approved by the General Manager of IT Services or appointed representative.

.2 Power and cooling requirements of the racks/cabinets must be approved by the CAA IT Services Coordinator

.3 Access and clearances must be approved by the CAA IT Services Coordinator

.4 ITB Comm Room Racks and Cabinets (Cooper B-Line)

.1 4 post adjustable rack – (45U) SB837072CFB

.2 4-post rack security door –SBRSD84XU

.3 Vertical cable manager – 10" x 9.4" c/w removable door

.4 Horizontal cable management (2U) – RFM-192D-HCM-F

.5 Horizontal cable trough –SB81319UT6

.6 Fiber cable manger (Yellow) – Electron Metal CMS-0038130-002(1-Rack), CMS-0037475-002 (4-Rack), CMS-0037475-001(5-Rack), CMS-0037475-003(7-Rack)

.7 APC Datacenter Cabinets – APC AR3100 (24"W x 42"D), AR3150 (30" X 42"D)

.5 DTB Comm Room Racks and Cabinets (RF Mote / APC)

.1 2 post rack – RFM-1944-RB (confined rooms)

.2 Slimline vertical wall mount cabinet 5U–Electron Metal – WMC0037218-001

.3 4 post adjustable rack – RFM-1944-RB + RFM-FPRK (default)

.4 Vertical cable management 8" – RFM-RVCM-HD8 c/w removable door

.5 Vertical cable management 10" – RFM-RVCM-HD10 c/w removable door

.6 Horizontal cable trough 2u – RFM-119HCT-8

.7 Horizontal cable management (2U) – RFM-192D-HCM-F

.8 RF Mote 44u Server cabinet 42”d – RFM-304-283-USCMS-P

9.6 Rack Layout

.1 Single Racks in CERs shall be laid out in the following fashion:

.1 One vertical PDU is to be mounted to each of the rear rack rails. The bottom 6u space of the rack is to be reserved for an optional or future UPS

.2 Install one 8” wide vertical cable manager on each front rail of the rack

.3 Active components are to be mounted in the lower half of the rack in a single rack application. 2U horizontal cable managers are to be mounted above and below each switch

.4 Mount the 2u cable trough at the top of each rack, mount fiber panels directly below the cable trough, install a 5u blank panel for future fiber panels followed by category 6A patch panels.

.5 Unless otherwise specified, all cable terminations and active components shall be mounted in an Authority provided 4 post adjustable rack

.6 All racks are to be bolted to the floor and grounded per YYC standards

.7 For multi rack configurations refer to the YYC Comm Room Standards Document

9.7 Shallow CERs

.1 There are some CERs in use which do not have sufficient depth to handle the type of terminations previously listed. In these scenarios, the Authority fiber cables can terminate in a CommScope fiber ready wall mount enclosure. The complete solution is pre-terminated using OS2 singlemode fiber pre-terminated cable with MPO/MTP plug-n-play connectors and modules.

.2 Tenant fibers must terminate in the same manner. Variances in user interface connector types may be accommodated with conversion patch cords. All copper cables must terminate on equipment as described in the voice and data section.

.3 Slimline wall cabinets or swing out racks can be used if pre-approved by the General Manager of IT Services or appointed representative.

9.8 Cable

.1 Backbone Runs

.1 Indoor fiber backbone runs are to be CommScope, indoor pre-terminated fiber single mode (OS2) with MPO connectors and iPatch Ready patch panels with pre-terminated modules and LC interface. Cable jacket is to be FT-6 or CMP rated

.2 All single mode (OS2) fiber is to have a yellow jacket. These fiber cables are to be ordered through CommScope.

.3 Voice backbones are to be CommScope approved 25-200 pair cable indoor (plenum rated).

.1 Minimum 25 pair cable is to be used for small pair count installations.

.2 Cables run through duct banks must be suitably rated for that application.

.2 Inside plant fiber optic cable to be CommScope tight-buffer, indoor, cables.

.1 Single-Mode Fiber (OS2), FT6 plenum rated unless used in Ducts.

.3 Horizontal

.1 Direct runs of 4 pair cable from telecomm CERs to common-use outlets are to be minimum CommScope Systimax Category 6A cables, CMP rated (minimum FT6) and Cat 6a jacks.

.2 Terminations are to be on CommScope data outlet and mounted in CommScope stainless steel faceplates. Information outlet shall be 8 pin, 568A coded, with gray modules for data and white modules for telephone. Faceplates shall be stainless steel with filler plates as required.

9.9 Building Entrance Protection

.1 Surge protectors shall be Surge Technologies ST690 B Series or Circa equivalent. Provide solid state protector modules 1:1 at each end of all cables entering or exiting a building or outdoor duct bank.

10 Communications Equipment Rooms (CERs)

*Refer to YYC Comm Room Standards Document, Appendix A

10.1 General Practices

.1 All work within CERs must be done as indicated on drawing submissions. Any cabling to GIGABIX mounts is not to cross over jumper channels.

.2 Any transition of cables from floor to ceiling or ceiling to floor is to take place as close as practical to corners or the edge of the backboard or through approved raceways.

.3 If insufficient backboard space exists, the tenant is to provide additional space as required.

.4 Any cables transitioning more than 45cm to racks/cabinets from cable tray are to be supported via basket cable tray. Basket cable tray minimum size to a rack is 305mmx102mm.

.5 No cables are to run diagonally within a CER. All cables are to be fastened to walls in appropriate spacing to prevent sag or bulging of cables.

.6 Fiber and Backbone copper cables will have a controlled amount of service slack, i.e. Service loops are to be implemented, with a minimum of 5m slack to be left at the rack end for proper termination and the outlet shall have one meter of length. Horizontal copper cables will also have controlled service loops of approx. 5m at the rack termination.

.7 Velcro Straps are to be used with appropriate sized saddles; the cable must be dressed in with the bundle as opposed to tied on top of the bundle. FT-6 rated Velcro straps are to be used in all plenum installations. Proper care must be taken to ensure cables are not squeezed or deformed. Additional cable support may require the installation of a cable trough system or alternate means to appropriately support the cable system.

.8 Access to CERs must be available from a hallway or other common area.

.9 CERs shall be located above any potential threat of flooding. CERs shall have appropriate floor drain, temperature sensors, and water sensors on the floor around the racks/cabinets.

10.2 Environmental Control

.1 All CER must be equipped with a continuous and dedicated air conditioning unit that will provide cooling 24 hours per day and 365 days per year to match the maximum heat loads of the equipment in the room.

.2 Positive pressure shall be maintained with a minimum of one (1) air change per hour.

.3 The temperature shall be maintained between 21°C and 23°C at 30 to 55% relative humidity.

.4 Filter systems are required for all ventilation points in CERs with a minimum filtration of MERV 11.

10.3 Working clearances

.1 A minimum of 1m of clear working space must be provided around at least three sides of the equipment rack or row of racks.

.2 A minimum clearance of 1m above the racks is required for cable pathways

10.4 CER Size

.1 CERs shall be of sufficient size to satisfy electrical code working space clearance requirements and to accommodate the requirements of the floor or section.

.2 A minimum CERs space of 10ft x 10ft is required to house IT and Security equipment with a single cabinet.

10.5 Doors and Access Control

.1 CER shall have fully opening (to 180° recommended) doors with a minimum width of 1m (36in) and height of 2.13m (84in). Door sills are not permitted because they impede the movement of equipment.

.2 A card access locking system shall be provided to control access to all CERs.

.3 Card access is to be used on all CER's or stand-alone cabinets.

10.6 Ceiling Height

.1 The minimum ceiling height is 3.05m (10ft) above the finish floor (AFF).

.2 False ceilings (T-bar) are not recommended in CERs to allow for maximum flexibility and accessibility of cabling pathways.

10.7 Fire Protection (see Appendix C)

.1 Provide fire protection, (as required by applicable codes) a hard wired smoke detector shall be provided in each CER.

.2 Sprinkler heads within the CER must incorporate wire cages as preventative measures to accidental damage.

.3 For wet pipe systems, drainage troughs and drip trays are required to protect electronic equipment from any leakage that might occur.

.4 A "dual pre-action interlock/dry pipe" sprinkler system should be considered for CER to prevent water damage.

*Manufactures clearances are to maintained around Emitters

10.8 Lighting

.1 A minimum equivalent of 500 Lux (50 foot-candles) measured 1m (3ft) above the finished floor shall be provided. Dimmer are not recommend.

.2 Light fixtures shall be located 2.6m (8.5ft) above the finished floor and positioned in front and behind the racks

.3 LED lights are to be used

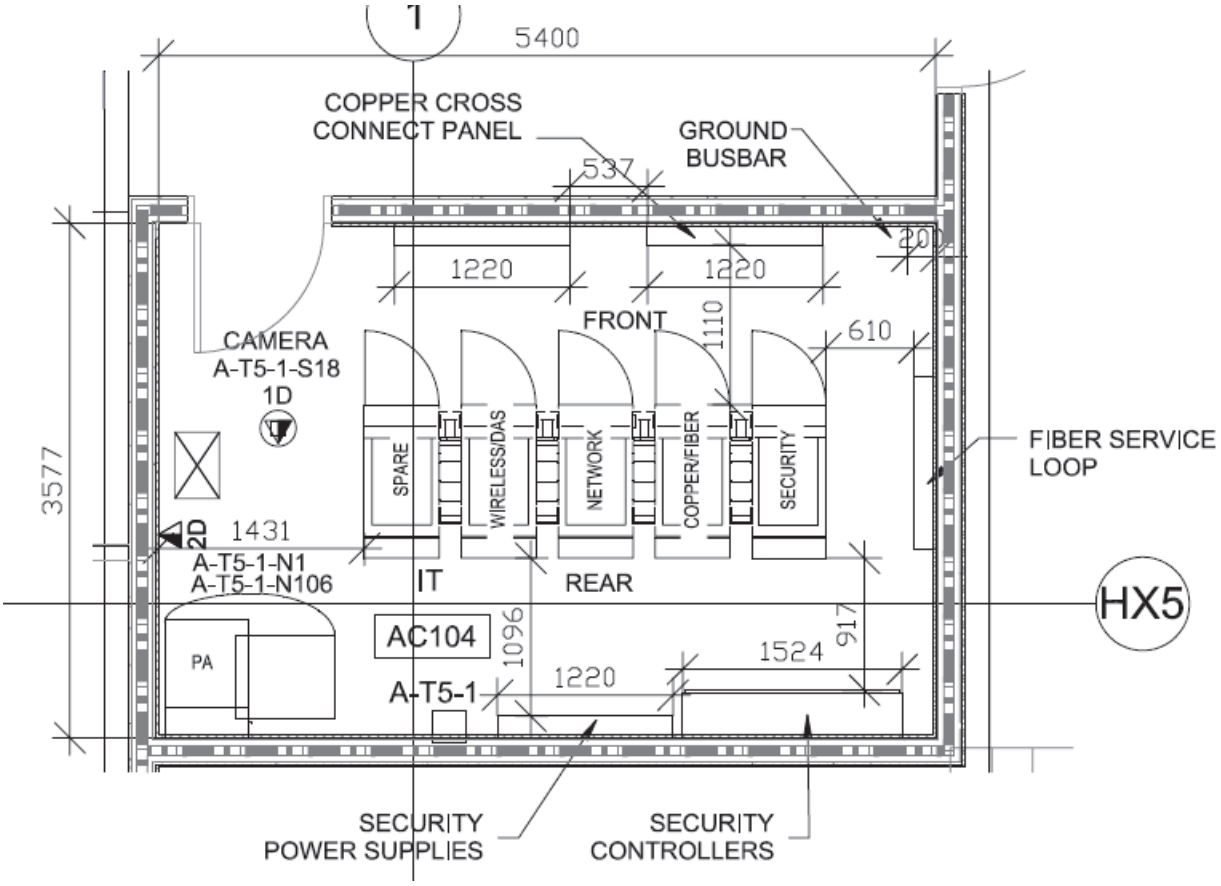
10.9 Floor Loading

.1 A minimum floor loading of 2.4kPa (50 lbf/ft^2) must be provided.

.2 Flooring shall consist of anti-static vinyl tile or finished concrete.

.3 Floors shall be sealed concrete at minimum.

10.10 Typical CER Layout



11 Installation Requirements and Practices

11.1 Installation Requirements – Communications Cable

.1 All proposed new runs of conduit must be indicated on drawings and information regarding proposed routing must be provided for approval prior to issuance of a Construction Installation Permit (CIP).

.2 All cable is to be run in conduit or communication trays at 90 degree angles.

.3 Any cable bundles extending beyond 30 cm (12”) must be supported with cable tray or basket tray. Future growth capacity of 100% should be used when calculating tray size for new installations.

.4 Minimum conduit size is 32mm ($1^{1/4}$”) and 40% fill ratio shall be maintained when filling the conduit with cables. The minimum outlet box depth to be 54mm (2.125”) and 4” square to accommodate Cat 6a cable diameters.

.5 Bush, ream and remove any sharp projections on all conduits.

.6 All conduits/tray shall be run in most direct route possible parallel or perpendicular to building lines with proper support.

.1 Conduits must be suspended from or attached to the structural ceiling or walls with hardware or other installation aids specifically designed to support their weight.

.7 All conduits to be rigid metal conduit (EMT) c/w pull strings. Rigid, heavy wall steel conduit is to be utilized in areas that are susceptible to mechanical damage. EMT coupling and connections shall be T&B steel, set screw type.

.8 All metallic metal conduits and metallic tray are to be bonded to ground on one or both ends, in accordance with national or local requirements.

.9 The integrity of all fire-stop barriers and water proofing for all building entrance penetrations must be maintained. Appropriate fire stopping must be installed to cap all empty sleeves, slots and penetrations and around all cables in sleeves, slot and penetrations in accordance with local, provincial and federal codes. All fire stopped penetrations to be identified with label detailing manufacture and product used, ULc System # and fire rating (1,2,3 hour rating) STI EZ Path to be used whenever low voltage cable and/or tray penetrates a fire wall or floor.

.10 Conduits with an internal diameter of 50mm (2") or less shall have a minimum bend radius at least six (6) times the internal conduit diameter. Conduits with an internal diameter of 50mm (2") shall have a minimum bend radius at ten (10) times the internal conduit diameter.

.11 Pull boxes, fittings or junction boxes shall be provided in conduit runs on the basis of not more than two (2) right angle bends or their equivalent nor more than 30m (100ft), in straight runs between boxes. Pull boxes to be sized to meet code requirements.

.12 Do not install conduit:

.1 Through areas in which flammable material may be stored,

.2 Over or adjacent to boilers, incinerators, hot water lines or steam lines

.13 Accurate and verified as-built drawings must be provided upon completion of all telecom/data installations. Drawings are to indicate number of pair run and CER.

.14 All communication outlet covers and pull boxes must be marked with the following information upon completion (following the Authority Communications Horizontal Cable Labeling Standards);

.1 Type of usage (i.e. TEL or DATA)

.2 Destination point of cable (i.e. CER)

.3 Port #

.15 Removal of all cables and associated connections is mandatory when a system or cable run is no longer in use. Advise the CAA IT Services Coordinator of cable pairs and block pairs now free as the result of this removal. Report changes to USG for updating FACTS or iPatch of all removed connections.

.16 All cables must be C.S.A. approved, and be at a minimum CMP (FT6) fire rating.

All telephone lines, fax lines, etc. shall be serviced by an existing telephone switch located in the Services Building Room SB203 The installation of PBX's, key systems, CPE equipment, Central Office Equipment, Payphone, and other similar products is prohibited unless specially authorized in writing by the IT Coordinator via TSR/CIP.

.17 All cable installed within the Air Terminal Complex common use areas is owned by the Authority. Tenants are responsible for cabling within their own areas. Any cable assigned to

dedicated use by the tenants outside of their lease space must have an agreement with the Authority prior to installation.

.1 Use faceplates and jack(s) as per Authority standards (CommScope Cat 6a).

.18 To minimize the possibility of interference, the following minimum clearances from electrical and heat sources must be maintained;

Item:	Minimum Clearance:
Motor	**1.2m (4ft)**
Transformers	**1.2m (4ft)**
Conduit and cables used for electrical distribution less than 1kV	**0.6m (2ft)**
Conduit and cables used for electrical distribution greater than 1kV	**1.0m (3ft)**
Fluorescent luminaires-Electronic	**15mm (.5ft)**
HVAC (equipment & ducts)	**300mm (1ft)**

.19 Do not use shared cable trays to distribute telecommunications and electrical power cables.

11.2 Connection to Backbone

.1 Under no circumstances is a tenant or a tenant's contractor allowed to connect to the Authority backbone unless with written approval from the Authority. All connections to the backbone must be made by TELUS upon receiving approval from the Authority

.2 Proper grounding and bonding is essential and reference shall be made to proper codes and standards. Grounding of metal shield shall be made with #6 AWG copper wire. Backbone systems must comply with all applicable national, regional and local building and electrical codes.

.3 All backbone cables shall be identified with permanent labels at both ends.

11.3 Rack Layout

.1 Single Racks in telephone CERs shall be laid out in the following fashion:

.1 One vertical PDU is to be mounted to each of the rear rack rails. The bottom 6u space of the rack is to be reserved for an optional or future UPS

.2 Install one vertical cable manager on each front rail of the rack

.3 Active components are to be mounted at the half way point of the rack. 2U horizontal cable managers are to be mounted above and below each switch

.4 Mount the 2u cable trough at the top of the rack, mount fiber panels directly below the cable trough, followed by category 6A patch panels.

.5 Unless otherwise specified, all cable terminations and active components shall be mounted in an Authority provided 4 post adjustable rack

.6 All racks are to be bolted to the floor and grounded per industry standards

.7 For multi rack configurations refer to the YYC Comm Room Standards Document

11.4 Common Use Area

.1 Due to physical space limitations in this area, all communication devices that are to be placed on a counter must be pre-approved.

.2 The tenant shall install facsimile machines or similar devices in their dedicated lockers.

.3 All building standards apply.

11.5 Horizontal Runs

.1 Horizontal cable runs are to follow the building lines and shall be installed in a star topology.

.2 Cables shall be placed in trays and or conduit. When placing cables in trays they should **not** be fastened to other cables or the tray itself, but should be installed in a neat and orderly manner.

.3 Care should be taken so as not to exceed fill limits (40%) when using conduit and tray.

.4 Care must be taken not to cause cable burn when pulling in cable.

.5 Do not pull cables in conduits that have existing cables, any exceptions require prior approval from the Authority, maximum conduit fill in such instances shall not exceed maximum conduit fill as identified in ANSI/TIA 569-C standards.

.6 Do not exceed 90 meters total length on any horizontal cable.

11.6 Backbone Runs

.1 Every ten meters there is to be a warning sticker placed lengthwise along the cable so that it can be clearly read. Bend radius and crush factors must be considered at all times. Fiber cable passing between floors is to do so within sleeves. Any penetration of walls is to be fire-stopped to Authority instructions.

.2 Copper backbones are to be laid in trays in a neat and orderly manner or installed in conduit. Penetration between floors is to be in sleeves. Any penetrations through walls are to be fire-stopped.

.3 All backbone fiber and cable that is run between communication rooms and is designated as a redundant feed or feeds another communication closet as a redundant feed is to be installed in a manner that is physically separate from the main backbone run with no sharing of the same path.

.4 All other installation standards listed in ANSI/TIA 568-C and TIA-569-C with latest addendums are to be followed.

11.7 Equipment Support

.1 All communications equipment, cabinet and pedestal shall be securely mounted to wall or floor using accepted installation practices.

Equipment Identification

.2 Provide 3mm thick plastic Lamacoid name plates, black face, white core, mechanically attached with self-tapping screws, 8mm high lettering, to be attached to the front and rear face of all racks/cabinets and wall mounted enclosures.

.3 Minimum size for Lamacoid name plate shall be 38mm high x 64mm wide with spaces for two lines text.

.4 The information on the label shall follow the Labeling Standard included in this document.

Example, R01 =Rack 1, C03= Cabinet 3, PA01= PA cabinet/rack 1

11.8 Plywood Backboard

.1 Plywood backboards shall be provided with a minimum 2440mm x 1220mm x 19mm thickness.

.2 Backboards are required anywhere YYC or tenant fiber or copper termination equipment is installed

.3 Plywood should be void-free and fire-retardant as well as treated with at least two (2) coats of white fire resistant paint on each side.

11.9 Wire Identification Materials

.1 The approved materials are as follows;

.1 Heat shrink sleeves by Brady, Panduit or Brother

11.10 Power

.1 Four (4) 20A, 120 volt, single phase dedicated, non-switched circuits shall be provided for each active equipment free standing rack.

.2 Two 208v, 30A three phase twistlock outlets should be provided for each data center cabinet.

.3 Two (2) 15A and one (1) 20A (UPS power), 120 volt, single phase dedicated, non-switched circuits shall be provided for each building entrance location.

.4 Two (2) 20A twistlock receptacles shall be provided and mounted at the bottom of active equipment free standing racks.

.5 Minimum wire size to #12 Cu XL

.6 Appropriately sized PDU's are to be used for each equipment rack or cabinet, power bars are not acceptable.

.7 UPS's are not to be daisy chained, refer to UPS section

.8 Utility, Generator and UPS power requirements are to be identified in the CIP application

.9 Outlets are to be labelled accordingly as utility, Generator or UPS and with the Grid location of the supply panel.

- These are minimum requirements and should be confirmed with every project.

11.11 Grounding

.1 All electronic equipment, racks, cabinets, tray, conduit and other equipment shall be grounded as per the applicable codes in use by the Authority. Approved Government and local codes shall take precedence over the requirements of this document.

.2 Grounding and bonding procedures outlined in TIA-607-B with latest addendum shall be strictly adhered to.

.3 All grounding requirements must be implemented to ensure personnel safety and equipment reliability. Industry-wide specifications, standards and applicable codes are required as a minimum and additional steps may be taken as required, based on system requirements and the site's geographical area.

.4 Abnormal and unusual conditions can sometimes require special effort to achieve an effectively bonded and grounded site.

.5 Provide grounding bus bar to all telecommunications rooms. The ground bus shall be tied into the building's low voltage grounding system.

.6 Utilize 2-hole compression type ground lugs for all connections to grounding bus bar and racks/cabinets.

.7 All racks, cabinets and horizontal communications pathways must be grounded using #6 AWG non insulated (minimum), stranded copper ground wires. Ensure that metal-to metal contact when grounding to paint or powder-coated surfaces.

.8 All racks, cabinets and horizontal communications pathways must be grounded to the ground bus-bar independently, not daisy chained.

12 Labeling

All labeling is to conform to ANSI/TIA-606-B standard and the consulting engineer with regards to color. Numbering and location of labeling is to conform to the Authority's Standard.

- Labels on copper and fiber cables are to be self-laminating adhesive wire markers produced with a laser printer.
- All Racks and cabinets are to be labelled with lamacoids riveted on the top frame rail.
- Labels on patch panels and outlet faceplates are to be either computer printable labels or labels produced with a Brother P Touch Label Maker or equivalent product. Hand printed is not acceptable.

12.1 Communication Cable Labeling Standards

.1 All installed copper and fiber optic cables are to be labelled 12" from the point of termination.

.2 All wall plate or work area termination plates are to be labelled

.3 All copper and fiber patch panel ports are to be labelled

.4 Once the label has been established, the Authority's Contractor, Unified System Group are to be notified of the labelled cable runs to ensure it is entered into the cable management database (FACTS or iPatch).

12.2 Section 1 – Horizontal Cable

.1 The following definitions apply to each of the cable types;

.1 Any cable being installed to an end user will have labels attached to both ends of the cable and on the faceplate and patch panel ports.

.2 Horizontal cable – Any horizontal cable utilizing a Category 6A cable or greater, which will be used for a single circuit application. When a horizontal cable is terminated within a riser room, it is to be labelled sequentially based upon how many horizontal cables are presently terminated in that room.

.3 Fiber – consists of any fiber cable being installed from a riser room to an end user.

.4 CAT6A/Fiber labeling: Category 6A cable & fiber is to be labeled with the following standard whose definitions can be found from the criteria below and with reference to the CAD drawings of the terminal;

.1 XXXXXX-ZZZ

.1 With "XXXXXX" being the Tenant/final destination of the horizontal cable with reference to the building grid designation.

.2 With "ZZZ" being the terminated number of that horizontal cable. Horizontal cables when terminated within a riser room will be labeled sequentially.

.5 An example of the labeling is listed below;

.1 M58V02-002

.1 M58V02 is the building grid number of the room (this can also be the room number where the horizontal cable is terminated.

.2 002 mean that it is the second horizontal cable that has been terminated in that particular riser room.

.3 The labeling of the cable should be done both in the CER and at the outlet (on the cable itself) and finally on the faceplate of the outlet jack.

12.3 Section 2 – Backbone Cable

.1 For a room to room circuit that utilizes either cable or fiber and does not terminate in a riser room, it is to have the following label on either end of the cable and where applicable on the faceplate of the terminated end.

.2 All backbone cables are to be labelled using the same convention as the horizontal cabling with the building grid room number to designate the opposing end termination location and the individual connector identifier.

13 Testing

All cables shall be tested after complete installation from termination end to termination end and in accordance with CommScope and Industry Standard specifications.

13.1 Fiber Testing Requirements

.1 Tier 1 Optical Loss Length Test in accordance with ANSI/TIA 568 C.0 and ANSI/TIA 568 C.1.

.2 Tier 2 Optical Time Domain Reflectometer trace in accordance with ANSI/TIA 568 C.0, ANSI/TIA 568 C.1 and TIA-526-7

.3 All fiber installed at the Airport shall be tested using Fluke Networks DTX-1800 or OptiFiber or pre-approved equal.

.4 Test results will be required to verify meeting or exceeding the manufacturer specifications for the fiber cable and mated connectors. A soft and hard copy of the power meter results shall be provided to the Authority upon completion of each project.

.5 An OTDR must be available to trouble shoot any anomalies in the test results or conduct testing at the discretion of the Authority or the consulting engineer.

.6 Power meter and light source testing shall be performed at standard wavelength (1310nm, 1550nm) in BOTH directions.

.7 Test results must be in a common database and meet ANSI/TIA 568 C requirements.

.8 Soft test results must be submitted in Linkware FLW format.

13.2 Copper Testing Procedures

.1 Contractor is to test to the TIA-568-B.2-10 and TIA 568C.1 permanent link Cat 6a testing standards and the following requirements within this specification.

.2 A Fluke DTX 1800 or pre-approved tester is to be used.

.3 Cabling systems shall meet or exceed the electrical and transmission characteristics of the systems specified.

.4 Cable segments and links shall be tested from both ends of the cable for each of the construction phases. (Verify that cable labeling matches at both ends).

.5 The system shall not be considered certified until the tester has acknowledged that the performance of the physical layer of the system has been fully tested and is operational at the completion of the installation phase.

.6 After the installation is complete, in addition to any other required testing as described herein, and at such times as the Owner/Engineer directs, the Contractor shall be present while the Owner conducts an operating test for approval. The installation shall be demonstrated to be in accordance with the requirements of this specification. Any defects revealed shall be corrected promptly at the Contractor's expense and retested for final documentation and commissioning.

.7 CommScope Certification documentation must be included with completion of all cabling projects within the YYC Campus, to be submitted within 30 days of project completion.

.8 After review of the completed test results, the Owner reserves the right to retest questionable cables, utilizing the Contractor's tester and the Contractor's labor.

.9 Alien Crosstalk Testing Preparation:

.1 The CommScope solution does not require Alien Crosstalk (AXT) testing to support their warranty.

.10 Field Testing Equipment: Submit during shop drawing review on the testing equipment to be utilized on this project. The installer shall test **all** cables installed under this Section.

.1 Category 6a Testing Equipment:

.1 Testing shall be accomplished using a UL Level IV field tester capable of testing to 900 MHz. Ensure that the tester has any necessary hardware or software upgrades, including AXT testing capabilities for testing Cat 6a installations.

.2 Provide factory calibration report of field test equipment showing calibration has been done within one year of test dates as per the TIA standards unless specified otherwise.

.11 Testing Procedures:

.1 Testing shall conform to the TIA 568B.2-10, and TIA-568-C.2 standards.

.2 Testing will be to the Permanent Link Test Parameters as identified by TIA standards.

.3 Tests shall be based on each pair of conductors and not the aggregate multiple pair results.

.4 Test cable segments end-to-end, from the telecommunications room horizontal patch panel to each work area outlet and from each telecommunications room backbone patch panel/cross-connect block panel to respective main cross connect, and from the work area outlet to the main cross-connect (through patch cables or cross- connect wiring) with a Signal Injector, Graphical Link Testing Meter and Time Domain Reflectometer (TDR) for compliance to latest TIA performance requirements.

.5 Provide report indicating failures and what actions were taken to ensure a passing horizontal cable and its terminations. Any cable failing the certification test (Fail, Fail* or, Pass*) must have remedial work done to provide a full pass test result; Remediation may include re-termination or replacement of the cable, which fails. No cables passing within tolerance only (Conditional Pass*) will be accepted.

.12 Test results:

.1 The test results information for each link shall be recorded in the memory of the field tester upon completion of the test. The tester shall be capable of storing test data in either internal or external memory. The external media used shall be left to the discretion of the user.

.2 Test results saved by the tester shall be transferred into a Windows based database utility that allows for maintenance, inspection and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered as well as any printed reports generated from the software application.

.3 Optional formats of data reporting are: Portable Document File (.pdf)

.4 All fiber tests shall include Budget loss and OTDR results

.5 Copper Test Results shall include the following:

.1 Applicable room number of jack location (room number per Contract Documents)

.2 Applicable Telecommunications Room number

.3 Circuit I.D. number with corresponding jack identifier

.4 Wire Map – shall include the following:

.1 Continuity to the remote end

.2 Shorts between any two or more conductors

.3 Crossed pairs

.4 Reversed pairs

.5 Split pairs

.6 Any other mis-wiring

.5 Length

.6 Insertion Loss

.7 Near-end Crosstalk (NEXT) Loss

.8 PS-NEXT (Power Sum Near End Cross Talk)

.9 FEXT (Far End Crosstalk)

.10 ELFEXT (Equal Level Far End Cross Talk)

.11 PS-ELFEXT (Power Sum Equal Level Far End Cross Talk)

.12 Propagation Delay

.13 Delay Skew

.14 Return loss

.15 PSFEXT (Power Sum Far End Crosstalk)

.16 PSACRF (Power Sum Attenuation to Crosstalk Ratio, Far End)

.17 AACRF (Alien Attenuation to Crosstalk ratio, Far End)

.18 AFEXT (Alien Far End Crosstalk)

.19 ANEXT (Alien Near End Crosstalk)

.20 PSANEXT (Power Sum Alien Near End Crosstalk)

.21 PSAACRF (Power Sum Alien Attenuation to Crosstalk Ratio, Far End)

14 Network Equipment

In some areas of the property the Authority has implemented an active network using Enterprise grade data switches which in some cases provide active services on the Authority's Shared Communications Network. These services may be available to airport tenants and Carriers to provide trunking services between buildings on airport property. Additionally, Carriers may apply to the Authority to install their own switching equipment in Services Building Rm 203 or Meet-Me-Points and lease trunk cable in the form of dark fiber in order to reduce infrastructure costs.

.1 Installation of Tenant or Carrier Data Equipment

.1 Before the installation of any data equipment in an Authority CER, approval must be obtained from the Authority CAA IT Services Coordinator. A Telecom Service Request (TSR) must be submitted complete with a drawing showing the rack layout and location. The TSR and all pertinent information is to be e-mailed to the CAA IT Services Coordinator for approval at the following e-mail address TSR@yyc.com.

15 Construction Documents

Consultant shall contact Planning & Engineering and the Technical Data Centre (TDC) for updates and revisions to the standards and must ensure that the most current issue of the Airport Authority ISP Standards Manual is being use.

16 Inspection

Advise IT & Telecommunications 72 hours in advance for inspection of a telecommunications installation.

17 Records and As-Builts

Cable records must include cable numbers, cross–connections and test results.

.1 Project managers/Tenants are required to provide communications contractors with CAD drawings that were submitted for the CIP. These drawings will be the basis for the project as-builts and final CAD submissions.

.2 During the course of a project, one (1) set of accurate as-built drawings shall be available on site at all times for review by the Authority.

.3 Cable number shall be placed at the outlet location on as built drawings.

.4 As built drawings shall contain the cable type, cable identification and termination telecom room must be provided, both in hard copy and CD-ROM or portable flash drive (electronic format must include AutoCAD and PDF formats).

.5 A block diagram of the network interconnection and the associated infrastructure shall be provided with the as-builts.

.6 As-built drawings are to be submitted to the IT project coordinator for review and approval before submitting to Planning & Engineering for Records

.7 As-built drawings are to be submitted in PDF and CAD formats

18 Cable Management Information Requirements

All cabling information is to be captured and provided to the Authority as per the “Cable Management Information Requirements (Contractor Data Collection Process)” document for FACTS or iPatch entry.

19 Acceptance

Acceptance for project completion will be subject to a review of the documentation submitted and a records and/or a site review at the discretion of the Authority. Authority acceptance of the work performed will be based on the completeness of cable records and drawings as well as test results, neatness and compliance to standards. Any work not meeting these criteria must be rectified immediately. A copy of the application for certification must be submitted to the Authority upon completion. Acceptance reviews will be conducted within two weeks of receipt of the application for acceptance.

At the discretion of the Authority, the Contractor or Carrier will be responsible for providing a tour of the facility, a review of work completed, and a review of the documentation to assist in the acceptance process.

20 Submission for Exception

Any requests for exceptions will need to be highlighted as exceptions in the submitted scope of work. Exceptions will be considered only if they do not jeopardize the CommScope Certification.

21 ITOS Services Request Form

YYC CALGARY AIRPORT AUTHORITY

ITOS Service Request Form

Print Form

ITOS Services Request Form

This form must be used in all instances when requesting a change, addition, disconnection or removal of any telecommunication services or airport systems within the Calgary International and Spring Bank Airport property boundaries. These services include voice, data, video, internet, or any telecommunications and networking equipment.

THIS FORM IS NOT REQUIRED if you are requesting carrier services such as internet, phone, fax line, cable TV. Please see Appendix A.

Please fill in the required sections and e-mail your request to: TSR@yyc.com. Please attach any relevant drawings, quotes and documentation.

Internal use only	
Date Request Received:	
Date Scheduled:	

Tenant or Employee Contact Information:

Business Name:

Business Number:

Contact Name:

Contact Phone Number:

Contact Email:

Contact Fax Number:

Location at the Calgary International or Spring Bank Airport where service will be delivered:

Address:

Floor & Room #:

Existing Telephone # at service location:

☐ Utilities Level	☐ Food Court	☐ Concourse A
☐ Arrivals Level	☐ Mechanical Court	☐ Concourse B
☐ Departures Level	☐ Roof Court	☐ Concourse C
☐ Mezzanine Level	☐ Concessions Court	☐ Concourse D
☐ Other *(specify):*		

Site *(if not at the Airport Terminal Building)*:

☐ Airfield	☐ McKnight
☐ McCall North	☐ Deerfoot South
☐ McCall South	☐ Deerfoot North
☐ Spring Bank	☐ Other *(specify):*

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YYC CALGARY AIRPORT AUTHORITY

ITOS Service Request Form

Description of Request:
(Please fill in all sections)

This request involves the following activities:

☐ Installation	☐ Change	☐ Move	☐ Disconnect

This request involves the following services:

☐ Voice	☐ Comm Room Space	☐ Equipment
☐ Internet	☐ Duct / Tray Space	☐ Cabling
☐ Antenna Related	☐ Radio Related	
Network Access: ☐ Port ☐ VLAN ☐ Firewall ☐ IP Assignment ☐ WIFI SSID		
☐ CUPP	☐ Gate Management - DOU	☐ Flight Information Display
☐ Air Side Systems	☐ Ground Transport - Parking	☐ Public Address System
☐ Security – Access Control	☐ CCTV – Recording	
☐ Other *(specify):*		
Purchase Order Number *(if internal request)*:		

Scope of Work Description:

Please note that a CIP is required if the answer to any of the following is "Yes":

Yes	*No*	
☐	☐	*Is conduit required?*
☐	☐	*Is a new local cable required (all cable is to be at least CAT5e, thus old local loops are to be replaced)?*
☐	☐	*Are drawings or marked prints required?*

What is your required in-service date?	
Please list your chosen provider(s):	
Please provide a contact for your provider(s):	

Note: Customer information provided herein will be reviewed by both the Calgary Airport Authority. The customer hereby authorizes the information contained herein to be released to all personnel who require access to this information for review and approval purposes

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22 Acceptance Checklists

.1 Project General Information acceptance checklist
.2 Copper Backbone Cabling acceptance checklist
.3 Fiber Backbone Cabling acceptance checklist
.4 Backbone Pathway acceptance checklist
.5 Building service entrance acceptance checklist
.6 Copper Patch Panel acceptance checklist
.7 Fiber Patch Panel acceptance checklist
.8 Equipment Rack acceptance checklist
.9 Grounding Busbar acceptance checklist
.10 Plywood Backboard acceptance checklist
.11 Communications Equipment Room acceptance checklist
.12 Horizontal Copper Cabling acceptance checklist
.13 Horizontal Pathway acceptance checklist
.14 Workstation Outlet acceptance checklist

Project General Information Acceptance Checklist

Project:		Project No.:	
Date:			
Manufacturer:		Contractor:	

Indicate Acceptance with a (✔) mark

Installation Check	Yes	No	N/A	Comments
Project Type: ❑ New Construction ❑ Renovation				
Design Drawings Reviewed by CAA IT & T				
No. of Equipment Rooms				
No. of Telecommunications Rooms				
Fiber Cabling system installed				
Fiber Type: ❑ SMF OS2 MPO				
Copper Cabling system installed				
Category Type: ❑ Cat 6A				
Total no. of horizontal copper runs				
Backbone copper cabling system installed				
Category Type: ❑ Cat. 3				
No. of Pairs: ❑ 25pr ❑ 50pr ❑ 100pr ❑ Other				
Manufacturer Cabling Certification Received				
As-builts drawings Reviewed by CAA IT & T				

Attached Documents (Check all that apply)			
❑	Photographs	Pages	
❑	Data Sheets	Pages	
❑	Test reports	Pages	

Notes:

(Owner Representatives, Signature)	(Owner Representative Name)	(Date)
(Contractor, Signature)	(Contractor Name)	(Date)

Copper Backbone Cabling Acceptance Checklist

Project:		Room No.:	
Date:		Room Name:	
Cable Label:		Panel No.:	

Indicate Acceptance with a (✔) mark

Installation Check	Yes	No	N/A	Comments
Cable Rating: ❑ CMP ❑ CMP ❑ LSOH				
Copper cable pairs: ❑ 25pr ❑ 50pr ❑ 100pr ❑ Other				
Category of cable pair: ❑ Cat. 3				
Termination Type: ❑ GIGABIX ❑ RJ				
No. of 4 pairs cables: ❑ 2 ❑ 3 ❑ 4 ❑ 6 ❑ Other				
Category of 4pr cable: ❑Cat. 6A				
Termination Type (4pr): ❑ RJ45 ❑ pre-terminated				
Manufacturer: CommScope				
Part Number (cable pairs)				
Part Number (4 pairs)				
Labeling				
Testing				

Attached Documents (Check all that apply)			
❑	Photographs	Pages	
❑	Data Sheets	Pages	
❑	Test reports	Pages	

Notes:

(Owner Representatives, Signature) (Owner Representative Name) (Date)

(Contractor, Signature) (Contractor Name) (Date)

Fiber Backbone Cabling Acceptance Checklist

Project:		Room No.:	
Date:		Room Name:	
Fiber Label		Panel No.	

Indicate Acceptance with a (✔) mark

Installation Check	Yes	No	N/A	Comments
Fiber Type: ❑ SMF OS2				
Fiber Rating: ❑ CMP ❑ CMP ❑ LSOH				
No. of fiber strand: ❑ 12 ❑ 24 ❑ 48 ❑ Other				
Connector Type: ❑ LC ❑ MPO/MTP				
Manufacturer: CommScope				
Product part number				
Labeling				
Testing				

Attached Documents (Check all that apply)			
❑	Photographs	Pages	
❑	Data Sheets	Pages	
❑	Test reports	Pages	

Notes:

(Owner Representatives, Signature) (Owner Representative Name) (Date)

(Contractor, Signature) (Contractor Name) (Date)

Backbone Pathway Acceptance Checklist

Project:		Room No.:	
Date:		Room Name:	
		From Room:	

Indicate Acceptance with a (✔) mark

Installation Check	Yes	No	N/A	Comments
Pathway: ❑ Conduits ❑ Cable Tray				
Pathway entrance: ❑ Ceiling ❑ Wall ❑ Floor				
Number of conduits				
Size of conduits				
Size of cable tray				
Grounding and Bonding to: ❑ Conduits ❑ Cable Tray				
Fire stopping				
Future Pull String				

Attached Documents (Check all that apply)			
❑	Photographs	Pages	
❑	Data Sheets	Pages	
❑	Test reports	Pages	

Notes:

(Owner Representatives, Signature) (Owner Representative Name) (Date)

(Contractor, Signature) (Contractor Name) (Date)

Building Service Entrance Acceptance Checklist

Project:		Building No:	
Date:		Building Name:	
Fiber ID#:		Copper ID #:	
Fiber Type:		Copper Type:	
# of Strand:		# of Pair:	

Indicate Acceptance with a (✔) mark

Installation Check	Yes	No	N/A	Comments
Number of conduit and size installed				
Conduits from MH (ID #)				
All conduit(s) turned up, taped or capped, to prevent debris from entering the conduit				
200-lb test pull wire installed end-to-end (each conduit)				
Plywood Backboard installed				
Ground Bus installed on Plywood Backboard				
Surge Protector enclosure installed for copper cable (# of pair)				
Labeling				
#3 AWG green insulated copper ground wire to building main ground bus system				
#6 AWG copper ground wire to building entrance equipment				
Power receptacle installed – 2 @ 15/20Amp, 120V, 1PH				
Backfill Compaction Test report				

Attached Documents (Check all that apply)			
❑	Photographs	Pages	
❑	Data Sheets	Pages	
❑	Test reports	Pages	

Notes:

(Owner Representatives, Signature) (Owner Representative Name) (Date)

(Contractor, Signature) (Contractor Name) (Date)

Copper Patch Panel Acceptance Checklist

Project:		Room No.:	
Date:		Room Name:	
Panel ID #:		Rack No.:	
Manufacturer:		Position Rack:	

Indicate Acceptance with a (✔) mark

Installation Check	Yes	No	N/A	Comments
Copper Patch Panel Type: ❑ iPatch ❑ GIGABIX				
Rack Mounted Type				
Size: ❑ 1U ❑ 2U ❑ 3U ❑ 4U				
Ports: ❑ 24 ❑ 48 ❑ 96				
Adapter Panel Ports: ❑ 4 ❑ 6				
Connector Type: ❑ RJ45 ❑ GIGABIX				
Wall Mounted GIGABIX Type				
Pair Sizes: ❑ 25pr ❑ 50pr ❑ 100pr ❑ 200pr				
Termination Type: ❑ GIGABIX ❑ Other				
Part Numbers				
Labeling				
Testing				

Attached Documents (Check all that apply)			
❑	Data Sheets	Pages	
❑	Test reports	Pages	

Notes:

(Owner Representatives, Signature) (Owner Representative Name) (Date)

(Contractor, Signature) (Contractor Name) (Date)

Fiber Patch Panel Acceptance Checklist

Project:		Room No.:	
Date:		Room Name:	
Panel Label:		Rack No.:	
Manufacturer:		Rack Position:	

Indicate Acceptance with a (✔) mark

Installation Check	Yes	No	N/A	Comments
Fiber Patch Panel Type: ❑ Rack-iPatch ❑ Wall				
Rack Mounted Type				
Size: ❑ 1U ❑ 2U ❑ 3U ❑ 4U				
Ports: ❑ 24 ❑ 96 ❑ 144 ❑ 288				
Adapter Panel Ports: ❑ 6 ❑ 12				
Connector Type: ❑ LC ❑ MPO/MTP				
Pre-terminated fiber				
Fusion spliced fiber				
Wall Mounted Type				
Size:				
Ports: ❑ 12 ❑ 24 ❑ 48 ❑ 96				
Adapter Panel Ports: ❑ 6 ❑ 12				
Connector Type: ❑ LC ❑ MPO/MTP				
Fusion spliced fiber				
Part Numbers:				
Labeling				
Testing				

Attached Documents (Check all that apply)			
❑	Data Sheets	Pages	
❑	Test reports –Budget Loss and OTDR	Pages	

Notes:

(Owner Representatives, Signature) (Owner Representative Name) (Date)

(Contractor, Signature) (Contractor Name) (Date)

Equipment Rack Acceptance Checklist

Project:		Room No:	
Date:		Room Name:	
Rack No.:		Manufacturer:	

Indicate Acceptance with a (✔) mark

Installation Check	Yes	No	N/A	Comments
Freestanding Rack: ❑ Two posts ❑ Four posts				
Cabinet type c/w: ❑ Doors ❑ Side panels				
Rack (EIA 310D) size: ❑ 44U ❑ Other				
Cabinet (EIA 310D) size: ❑ 44U ❑ Other				
Freestanding Rack secured: ❑ Floor ❑ Ceiling				
Cabinet/Rack color: ❑ Black ❑ Other				
Cabinet/Rack grounded to grounding Busbar				
Ground wire size: ❑ Bare Cu. ❑ Green/Yellow Insulated Cu.				
Vertical Cable management installed: ❑ Left ❑ Right				
Vertical Cable management size(s)				
Horizontal 2u Cable manager installed:				
Horizontal Cable Trough installed:				
Vertical PDU: ❑ Left ❑ Right				
Rack UPS installed				
Electrical power outlets				
Cabinet/rack labeled				
Waterfall from tray to racks/cabinets				

Attached Documents (Check all that apply)			
❑	Photographs	Pages	
❑	Data Sheets	Pages	
❑	Test reports	Pages	

Notes:

(Owner Representatives, Signature) (Owner Representative Name) (Date)

(Contractor, Signature) (Contractor Name) (Date)

Grounding Busbar Acceptance Checklist

Project:		Room No.:	
Date:		Room Name:	
Label:			

Indicate Acceptance with a (✔) mark

Installation Check	Yes	No	N/A	Comments
Grounding busbar size: : ❑ Copper ❑ Aluminum				
Grounding wire size: ❑ Bare Cu. ❑ Green insulated Cu.				
Grounding busbar mounted on insulator				
Grounding to each equipment rack				
Grounding to cable tray				
Two holes compression grounding lugs for termination				
Accessibility of Grounding Busbar				

Attached Documents (Check all that apply)			
❑	Photographs	Pages	
❑	Data Sheets	Pages	
❑	Test reports	Pages	

Notes:

(Owner Representatives, Signature) (Owner Representative Name) (Date)

(Contractor, Signature) (Contractor Name) (Date)

Plywood Backboard Acceptance Checklist

Project:		Room No.:	
Date:		Room Name:	

Indicate Acceptance with a (✔) mark

Installation Check	Yes	No	N/A	Comments
Fire rated plywood – 1220mm x 2440mm x 19mmD				
Backboard painted on front, back and all sides				
Backboard meet AC Grade requirements				
Backboard with UL Classification of Fire retardant coating				
Backboard painted with fire retardant intumescent paint-White				
Backboard secured to wall				

Attached Documents (Check all that apply)			
❑	Photographs	Pages	
❑	Data Sheets	Pages	
❑	Test reports	Pages	

Notes:

(Owner Representatives, Signature)	(Owner Representative Name)	(Date)
(Contractor, Signature)	(Contractor Name)	(Date)

Communications Equipment Room Acceptance Checklist

Project:		Room No.:	
Date:		Room Name:	
		Room Size:	

Indicate Acceptance with a (✔) mark

Installation Check	Yes	No	N/A	Comments
Ceiling: ❑ T-Bar ❑ Open ❑ Other				
Ceiling Height:				
Lighting – 500 lux (minimum): ❑ Normal ❑ Emergency				
Floor finish: : ❑ Concrete ❑ Tile				
Room cleanliness				
Cable separation from EMI/RFI				
Equipment clearance – 1m (minimum)				
Fire Rated plywood backboard installed				
Grounding busbar installed				
Backbone pathway: ❑ Conduits ❑ Cable Tray				
Horizontal pathway: ❑ Conduits ❑ Cable Tray				
Number of equipment rack installed				
Lockable Door: ❑ Key ❑ Electronic Lock				
HVAC installed: ❑ 24/7 operation				
Fire stopping				
Fire Protection: ❑ Fire alarm system ❑ Sprinkler w/cage				
Security System: ❑ CCTV ❑ Card Reader				
Electrical Power: ❑ Normal ❑ Emergency ❑ UPS				
Sapphire Warning signs				

Attached Documents (Check all that apply)			
❑	Photographs	Pages	
❑	Drawing layout of Room	Pages	

Notes:

(Owner Representatives, Signature) (Owner Representative Name) (Date)

(Contractor, Signature) (Contractor Name) (Date)

Horizontal Copper Cabling Acceptance Checklist

Project:		Copper ID #:	
Date:		Cable From:	
From:		To:	

Indicate Acceptance with a (✔) mark

Installation Check	Yes	No	N/A	Comments
Cable Rating: ❑ CMP ❑ CMP ❑ LSOH				
CommScope System: ❑ CAT6A				
Labeling/Color Coding				
Copper Cable Length				
Copper Cable Secured and routed into patch properly				
Cable Termination Type: ❑ GIGABIX ❑ RJ45 ❑ Other				
Cable neatness				
All System Components Identified				
Equipment grounding				
Test reports				

Attached Documents (Check all that apply)			
❑	Photographs	Pages	
❑	Data Sheets	Pages	
❑	Test reports	Pages	

Notes:

(Owner Representatives, Signature)	(Owner Representative Name)	(Date)
(Contractor, Signature)	(Contractor Name)	(Date)

Horizontal Pathway Acceptance Checklist

Project:		Room No.:	
Date:		Room Name:	

Indicate Acceptance with a (✔) mark

Installation Check	Yes	No	N/A	Comments
Pathway: ❑ Conduits ❑ Cable Tray				
Pathway entrance: ❑ Ceiling ❑ Wall ❑ Floor				
Number of conduits				
Size of conduits				
Size of cable tray				
Grounding and Bonding to: ❑ Conduits ❑ Cable Tray				
Fire stopping				

Attached Documents (Check all that apply)			
❑	Photographs	Pages	
❑	Data Sheets	Pages	
❑	Test reports	Pages	

Notes:

(Owner Representatives, Signature)	(Owner Representative Name)	(Date)
(Contractor, Signature)	(Contractor Name)	(Date)

Workstation Outlet Acceptance Checklist

Project:		Room No.:	
Date:		Room Name:	
Manufacturer:		From:	

Indicate Acceptance with a (✔) mark

Installation Review						
Faceplate label	Mounting	Connector Type	Connector Label	Location		

Notes:

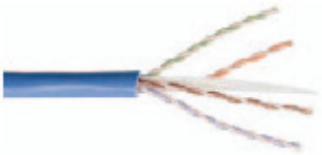
(Owner Representatives, Signature) (Owner Representative Name) (Date)

(Contractor, Signature) (Contractor Name) (Date)

23 Appendix-A: YYC COMM ROOM STANDARDS

24 Appendix-B: COMMSCOPE STRUCTURED CABLING SYSTEM

Category 6A U/UTP



CATEGORY 6A U/UTP COPPER CABLE

Material ID	Product Number	Description	Jacket Color	Length	Packaging
8765404/10	10G4 BLUE REEL	Ultra 10® 10G4 ETL Verified Category 6A U/UTP Cable, plenum	Blue	1000 ft (305 m)	Reel
8765484/30	10G4 BLUE ULTRA 10 REEL (3K)	Ultra 10® 10G4 ETL Verified Category 6A U/UTP Cable, plenum	Blue	3000 ft (914 m)	Reel
8765604/10	10G4 GRAY REEL	Ultra 10® 10G4 ETL Verified Category 6A U/UTP Cable, plenum	Gray	1000 ft (305 m)	Reel
8765504/10	10G4 WHITE REEL	Ultra 10® 10G4 ETL Verified Category 6A U/UTP Cable, plenum	White	1000 ft (305 m)	Reel
8441604/10	10GN4 BLUE REEL	Ultra 10® 10GN4 ETL Verified Category 6A U/UTP Cable, non-plenum	Blue	1000 ft (305 m)	Reel
8441804/10	10GN4 GRAY REEL	Ultra 10® 10GN4 ETL Verified Category 6A U/UTP Cable, non-plenum	Gray	1000 ft (305 m)	Reel
8441704/10	10GN4 WHITE REEL	Ultra 10® 10GN4 ETL Verified Category 6A U/UTP Cable, non-plenum	White	1000 ft (305 m)	Reel

CATEGORY 6A U/UTP MODULAR PANELS

Material ID	Product Number	Description
760118208	CS-MOD-1U-36P-ANG	CommScope® U/UTP Angled Modular Panel, 36 port
760118182	CS-MOD-1U-36P-FLAT	CommScope® U/UTP Flat Modular Panel, 36 port
760118216	CS-MOD-2U-72P-ANG	CommScope® U/UTP Angled Modular Panel, 72 port
760118190	CS-MOD-2U-72P-FLAT	CommScope® U/UTP Flat Modular Panel, 72 port
760049932	M2000-24 1U	CommScope® M2000 U/UTP Modular Panel 1U, 24 port
760049940	M2000-48 2U	CommScope® M2000 U/UTP Modular Panel 2U, 48 port
760049957	M2000A-24 1U	CommScope® M2000 U/UTP Modular Panel 1U, 24 port angled
760049965	M2000A-48 2U	CommScope® M2000 U/UTP Modular Panel 2U, 48 port angled
760101220	M2100-24 1U Modular Patch Panel	CommScope® M2100 U/UTP Modular Panel 1U, 24 port
760077842	M2100-48 2U Modular Patch Panel	CommScope® M2100 U/UTP Modular Panel 2U, 48 port
760105429	M4800-1U-GS	CommScope® M4800 1U Modular Panel, 48 port
760109744	M4800A-1U-GS	CommScope® M4800A 1U Angled Panel, 48 port
760115360	MOD-ANG-24P	Commscope® Modular Angled Outlet Panel, 24 port
760115378	MOD-ANG-48P	Commscope® Modular Angled Outlet Panel, 48 port
760115386	MOD-V-24P	Commscope® Modular Vertical Outlet Panel, 24 port
760115394	MOD-V-48P	Commscope® Modular Vertical Outlet Panel, 48 port

CATEGORY 6A U/UTP INFORMATION OUTLETS

Material ID	Product Number	Description	Color
760150037	UNJ10G-AL	Uniprise Ultra 10* UNJ10G Information Outlet	Almond
760149922	UNJ10G-BK	Uniprise Ultra 10* UNJ10G Information Outlet	Black
760150078	UNJ10G-BK/100	Uniprise Ultra 10* UNJ10G Information Outlet, 100 pack	Black
760150011	UNJ10G-BL	Uniprise Ultra 10* UNJ10G Information Outlet	Blue
760150086	UNJ10G-BL/100	Uniprise Ultra 10* UNJ10G Information Outlet, 100 pack	Blue
760150045	UNJ10G-BN	Uniprise Ultra 10* UNJ10G Information Outlet	Brown
760149955	UNJ10G-CM	Uniprise Ultra 10* UNJ10G Information Outlet	Cream
760149963	UNJ10G-GR	Uniprise Ultra 10* UNJ10G Information Outlet	Green
760149997	UNJ10G-GY	Uniprise Ultra 10* UNJ10G Information Outlet	Gray
760149971	UNJ10G-IV	Uniprise Ultra 10* UNJ10G Information Outlet	Ivory
760150052	UNJ10G-IV/100	Uniprise Ultra 10* UNJ10G Information Outlet, 100 pack	Ivory
760149930	UNJ10G-OR	Uniprise Ultra 10* UNJ10G Information Outlet	Orange
760150003	UNJ10G-RD	Uniprise Ultra 10* UNJ10G Information Outlet	Red
760150029	UNJ10G-VL	Uniprise Ultra 10* UNJ10G Information Outlet	Violet
760149989	UNJ10G-WH	Uniprise Ultra 10* UNJ10G Information Outlet	White
760150060	UNJ10G-WH/100	Uniprise Ultra 10* UNJ10G Information Outlet, 100 pack	White
760149948	UNJ10G-YL	Uniprise Ultra 10* UNJ10G Information Outlet	Yellow

CATEGORY 6A U/UTP PATCH CORDS

Material ID BASE Code	Product Number	Type	Information Outlet Color	Jacket Color									UOM	Cable/Cordage Length Options
				BK	OR	RD	WH	YL	GY	VL	GR	BL		
UC1AAA2	UNC10G	U/UTP Modular Patch Cord	0				8		C			Z	F,M	7-100ft/2-30m

Ordering Material ID Example: U C 1 A A A 2 - 0 8 F 0 0 7 (UNC10G-WH-7F)

Cable Assemblies

Select appropriate cable code from ordering information tables based on cable preference and specify customized cables code including length per cable configurator.

InstaPATCH® 360 Trunk Cables and Extensions

The InstaPATCH® 360 trunk cables feature a round cable construction which eliminates bend sensitivity allowing for easy routing and are offered in 12, 24, 36, 48, 72, 96 and 144 fibers. The cables are constructed with multiple subunits, each with 12 fibers and terminated on both ends with MPO connectors.

All trunk cables can be ordered with or without a pulling grip and with or without a cable mounting gland.

Trunk extensions use a pinned MPO on one end and a non-pinned MPO on the opposite end. These are used to extend a system to a new area.

InstaPATCH® 360 TRUNK CABLES AND TRUNK EXTENSIONS

1 2	3	4 5	6 7	8	9	10	11	12	13	14 - 16
F G	X	M P	M P	A	D	-	A	A	F	010

Prefix
- FG Trunk-Plenum
- FH Trunk-Plenum Armored
- FJ Trunk-LSZH
- FK Trunk-LSZH Armored

Fiber Type
- X LazrSPEED 550 Multimode
- Z LazrSPEED 300 Multimode
- H LazrSPEED 150 Multimode
- M OptiSPEED Multimode**
- W TeraSPEED Singlemode

Connector 1
- MP MPO (Female No Pins)

Connector 2
- MP MPO (Female No Pins)
- MX MPO (Male Pins)

Cordage Size
- A 12 Fiber PmP Cable
- D 12 Fiber PmP I/O Cable

Fiber Count
- D 12 Fiber**
- F 24 Fiber
- G 36 Fiber
- H 48 Fiber
- K 72 Fiber
- L 96 Fiber
- M 144 Fiber

Jacket Color
- A Blue
- B Orange
- C Green
- D Brown
- E Slate
- G Red
- H Black
- J Yellow
- K Violet
- L Rose
- M Aqua

• OptiSPEED standard is Slate
• TeraSPEED standard is Yellow
• LazrSPEED standard is Aqua

Breakout Length
- A No Gland
- B With Gland
- C Pulling Grip

UOM
- F Feet
- M Meter

Length
- 10-999 Feet
- 3-999 Meters

Cable Assemblies (cont.)

Select fanout cables and/or cords to connect to equipment or for cross-connect.

InstaPATCH® 360 Ruggedized and Array Fanout Cables

The InstaPATCH® 360 ruggedized fanout cables support the direct connection to the equipment from the patch panel. Terminated with MPO connectors on one end and clipped duplex connectors (LC, SC or ST) on the other end, the ruggedized fanout cables are available in 12-, 24-, 36-, 48- and 72- fiber counts. Female MPO (MP - no pins) fanouts are utilized for connections to equipment from a InstaPATCH 360 module. Male MPO (MX - pinned) fanouts are utilized for connections to equipment directly from a trunk cable.

Array fanouts can be terminated with MPO connectors on one end and clipped duplex connectors (LC, SC, ST) on the other end. Different from ruggedized fanouts which include an outer sheath to protect the fiber on longer runs between racks, array cords utilize 3.0 mm 12 fiber cordage that is protected with aramid yarn for durability and allowing maximum flexibility within a rack/cabinet. Array fanouts with MPO to duplex connectors (LC, SC, ST) are used for directly connecting equipment to a trunk or InstaPATCH 360 Module.

InstaPATCH® 360 RUGGEDIZED FANOUT CABLES

1 2	3	4 5	6 7	8	9 10 11	12	13	14 - 16
F L	X	M P	L A	A	D - M	E	F	010

Prefix	Fiber Type	Connector 1	Connector 2	Cordage Size	Fiber Count	Jacket Color	Breakout Length	UOM	Breakout Length
FL Rugged F/O Plenum	X LazrSPEED 550 Multimode	MP MPO (Female No Pins)	LA LC Angled	A 12 Fiber PmP Cable	D 12 Fiber	A Blue	A No Gland	F Feet	24 in 7-999 ft
FM Rugged F/O Plenum Armored	Z LazrSPEED 300 Multimode	MX MPO (Male Pins)	LC LC Standard	D 12 Fiber PmP I/O Cable	F 24 Fiber	B Orange	E 24 in Breakout No Gland	M Meter	48 in 9-999 ft
FN Rugged F/O LSZH*	H LazrSPEED 150 Multimode		LU LC Uniboot*		G 36 Fiber	C Green	F 24 in Breakout With Gland		72 in 11-999 ft
FP Rugged F/O LSZH Armored*	M OptiSPEED Multimode		SA SC Angled		H 48 Fiber	D Brown	G 24 in Breakout Pulling Grip		96 in 13-999 ft
* Only Available in EMEA	W TeraSPEED Single-mode		SC SC Standard		K 72 Fiber	E Slate	H 48 in Breakout No Gland		24 in 2-999 m
			ST STII			G Red	J 48 in Breakout With Gland		48 in 3-999 m
			MJ MTRJ			H Black	K 48 in Breakout Pulling Grip		72-96 in 4-999 m
			FA FC Angled			J Yellow	L 72 in Breakout No Gland		
			FC FC Standard			K Violet	M 72 in Breakout With Gland		
						L Rose	N 72 in Breakout Pulling Grip		
						M Aqua	P 96 in Breakout No Gland		
						• OptiSPEED standard in Slate	Q 96 in Breakout With Gland		
						• TeraSPEED standard in Yellow	R 96 in Breakout Pulling Grip		
						• LazrSPEED standard in Aqua			

InstaPATCH® 360 ARRAY FANOUT CABLES

1 2	3	4 5	6 7	8	9 10 11	12	13	14 - 16
F Q	X	M P	L A	G	D - A	E	F	010

Prefix	Fiber Type	Connector 1	Connector 2	Cordage Size	Fiber Count	Jacket Color	Breakout Length	UOM	Breakout Length
FQ Array Plenum	X LazrSPEED 550 Multimode	MP MPO (Female No Pins)	LA LC Angled	G 12 Fiber PmP Array Cord	D 12 Fiber	E Slate	D 12 in Breakout No Gland	F Feet	12 in 2-999 ft
FR Array LSZH	Z LazrSPEED 300 Multimode	MX MPO (Male Pins)	LC LC Standard	* Only Available in EMEA		J Yellow	E 24 in Breakout No Gland	M Meter	24 in 4-999 ft
	H LazrSPEED 150 Multimode		LU LC Uniboot*			A Aqua	H 48 in Breakout No Gland		48 in 6-999 ft
	M OptiSPEED Multimode* *		LM Mini LC				L 72 in Breakout No Gland		72 in 8-999 ft
	W TeraSPEED Single-mode		SA SC Angled				P 96 in Breakout No Gland		96 in 10-999 ft
			SC SC Standard*						24 in 1-999 m
			ST STII						48 in 2-999 m
			MJ MTRJ						72 in 3-999 m
			FA FC Angled						96 in 4-999 m
			FC FC Standard						
						• OptiSPEED only available in Slate			
						• TeraSPEED only available in Yellow			
						• LazrSPEED only available in Aqua			

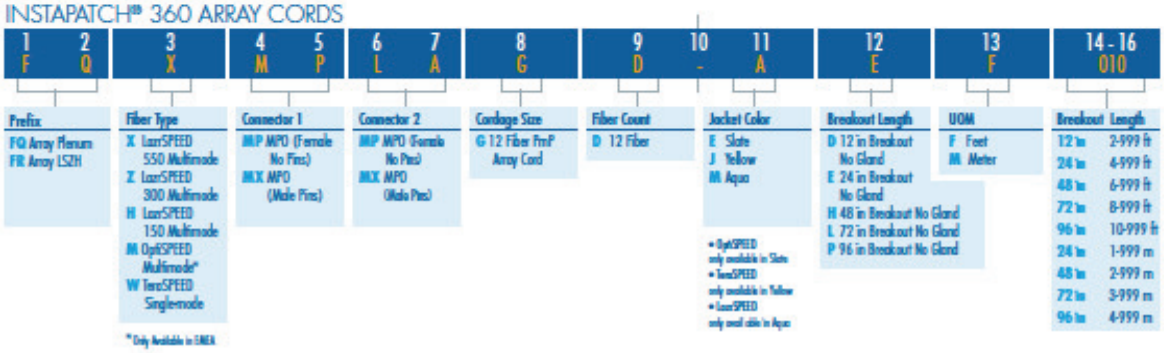
Cable Assemblies (cont.)

Select fanout cables and/or cords to connect to equipment or for cross-connect.

InstaPATCH® 360 Array Cords

Array cords are terminated with MPO connectors on both ends. MPO to MPO array cords are used for trunk extension, cross-connect applications or patching into parallel transceivers or array equipment.

INSTAPATCH® 360 ARRAY CORDS



Patch Cords

Select patch cords to connect to equipment or for cross-connect.

Fiber Optic Patch Cords

The final fiber optic component of your connectivity solution, Fiber Optic Patch Cords support the connection of the backbone fiber cabling plant to the transceiver/optical electronics. Patch cords (a.k.a. jumpers) are also used to cross-connect segments of cabling infrastructure to another.

Made of rugged round construction in customer-specified lengths of 1- or 2- fiber cable, our patch cords are available in LazrSPEED, TeraSPEED and OptiSPEED in any combination of SC, LC and ST connectors.

FIBER OPTIC PATCH CORDS CONFIGURATOR

1 2	3	4 5	6 7	8	9 10 11	12	13	14 - 16
F D	X	L 1	L 1	2	1 - A	X	F	010

Prefix
- FD Jumper-Plenum
- FE Jumper-Riser
- FF Jumper-LSZH

Fiber Type
- X LazrSPEED 550 Multimode
- M OptiSPEED Multimode
- W TeraSPEED Singlemode

Connector 1
- LC LC Standard
- SC SC Standard
- ST STII
- LA LC Angled
- SA SC Angled
- L1 LC Keyed Red
- L2 LC Keyed Yellow
- L3 LC Keyed Blue
- L4 LC Keyed Green
- L5 LC Keyed Orange
- L6 LC Keyed Slate
- L7 LC Keyed Brown
- L8 LC Keyed Aqua
- L9 LC Keyed Rose
- LV LC Keyed Violet
- LU LC Uniboot*

Connector 2
- LC LC Standard
- SC SC Standard
- ST STII
- LA LC Angled
- SA SC Angled
- L1 LC Keyed Red
- L2 LC Keyed Yellow
- L3 LC Keyed Blue
- L4 LC Keyed Green
- L5 LC Keyed Orange
- L6 LC Keyed Slate
- L7 LC Keyed Brown
- L8 LC Keyed Aqua
- L9 LC Keyed Rose
- LV LC Keyed Violet
- MJ MTRJ
- FC FC Standard
- FA FC Angled
- LU LC Uniboot*
- LM Mini LC

*Only Available in CMEA

Cordage Size
- 2 1.6mm Simplex
- 3 3.0mm Simplex
- 4 1.6mm Zipcord
- 5 3.0mm Zipcord

Fiber Count
- 1 1 Fiber
- 2 2 Fiber

Jacket Color
- A Blue
- B Orange
- C Green
- D Brown
- E Slate
- G Red
- H Black
- J Yellow
- K Violet
- L Rose
- M Aqua

Breakout Length
- X No Breakout

UOM
- F Feet
- M Meter

Breakout Length
- 2-999 Feet
- 1-999 Meters

Pulling Grips

Stand-alone pulling grip kits are also offered in four different sizes: one for 12 fibers, one for 24 fibers, one for 36, 48 and 72 fibers, one for 96 and 144 fibers. The grips are reusable, so the installer can order one pulling grip kit for every 5 or 10 cables instead of ordering all trunk cables with pulling grips installed.

PULLING GRIPS

Ordering Information		
Material ID	Description	Color
760060541	InstaPATCH® Pulling Grip Kit, 12 Fiber	black label
760060558	InstaPATCH® Pulling Grip Kit, 24 Fiber	gray label
760060566	InstaPATCH® Pulling Grip Kit, 36/48/72 Fiber	blue label
760060574	InstaPATCH® Pulling Grip Kit, 96/144 Fiber	green label

FIBER OPTIC CABLE - ALL DRY OUTSIDE PLANT
STRANDED LOOSE TUBE NON-ARMORED ALL DIELECTRIC

Material ID	Product Number	Description
760007377	D-012-LN-5K-F12NS	Outside Plant, 12 fiber, LazrSPEED 550 50µm multimode
760054296	D-024-LN-5K-F12NS	Outside Plant, 24 fiber, LazrSPEED 550 50µm multimode
760054312	D-048-LN-5K-F12NS	Outside Plant, 48 fiber, LazrSPEED 550 50µm multimode
760054338	D-072-LN-5K-F12NS	Outside Plant, 72 fiber, LazrSPEED 550 50µm multimode
760054353	D-144-LN-5K-F12NS	Outside Plant, 144 fiber, LazrSPEED 550 50µm multimode
760054361	D-288-LN-5K-F12NS	Outside Plant, 288 fiber, LazrSPEED 550 50µm multimode
760054171	D-012-LN-5L-F12NS	Outside Plant, 12 fiber, LazrSPEED 300 50µm multimode
760054189	D-024-LN-5L-F12NS	Outside Plant, 24 fiber, LazrSPEED 300 50µm multimode
760054205	D-048-LN-5L-F12NS	Outside Plant, 48 fiber, LazrSPEED 300 50µm multimode
760054221	D-072-LN-5L-F12NS	Outside Plant, 72 fiber, LazrSPEED 300 50µm multimode
760054247	D-144-LN-5L-F12NS	Outside Plant, 144 fiber, LazrSPEED 300 50µm multimode
760054254	D-288-LN-5L-F12NS	Outside Plant, 288 fiber, LazrSPEED 300 50µm multimode
760054064	D-012-LN-5M-F12NS	Outside Plant, 12 fiber, LazrSPEED 150 50µm multimode
760054072	D-024-LN-5M-F12NS	Outside Plant, 24 fiber, LazrSPEED 150 50µm multimode
760054098	D-048-LN-5M-F12NS	Outside Plant, 48 fiber, LazrSPEED 150 50µm multimode
760054114	D-072-LN-5M-F12NS	Outside Plant, 72 fiber, LazrSPEED 150 50µm multimode
760054130	D-144-LN-5M-F12NS	Outside Plant, 144 fiber, LazrSPEED 150 50µm multimode
760054148	D-288-LN-5M-F12NS	Outside Plant, 288 fiber, LazrSPEED 150 50µm multimode
760053959	D-012-LN-6F-F12NS	Outside Plant, 12 fiber, OptiSPEED 62.5/125µm multimode
760053967	D-024-LN-6F-F12NS	Outside Plant, 24 fiber, OptiSPEED 62.5/125µm multimode
760053983	D-048-LN-6F-F12NS	Outside Plant, 48 fiber, OptiSPEED 62.5/125µm multimode
760054007	D-072-LN-6F-F12NS	Outside Plant, 72 fiber, OptiSPEED 62.5/125µm multimode
760054023	D-144-LN-6F-F12NS	Outside Plant, 144 fiber, OptiSPEED 62.5/125µm multimode
760054031	D-288-LN-6F-F12NS	Outside Plant, 288 fiber, OptiSPEED 62.5/125µm multimode
760053843	D-012-LN-8W-F12NS	Outside Plant, 12 fiber, TeraSPEED 8.3/125µm single-mode
760053850	D-024-LN-8W-F12NS	Outside Plant, 24 fiber, TeraSPEED 8.3/125µm single-mode
760053876	D-048-LN-8W-F12NS	Outside Plant, 48 fiber, TeraSPEED 8.3/125µm single-mode
760053892	D-072-LN-8W-F12NS	Outside Plant, 72 fiber, TeraSPEED 8.3/125µm single-mode
760053918	D-144-LN-8W-F12NS	Outside Plant, 144 fiber, TeraSPEED 8.3/125µm single-mode
760053926	D-288-LN-8W-F12NS	Outside Plant, 288 fiber, TeraSPEED 8.3/125µm single-mode

READY SHELVES

Material ID	Product Number	Description
760147439	RFE-SLC-IS-EMT-BK/1U-PNL	Ready™ 1U Internal Sliding Shelf, black
760147447	RFE-SLC-IS-EMT-BK/2U-PNL	Ready™ 2U Internal Sliding Shelf, black
760147454	RFE-SLC-IS-EMT-BK/4U-PNL	Ready™ 4U Internal Sliding Shelf, black

READY WALL MOUNT ENCLOSURES

Material ID	Product Number	Description
760147496	WBE-EMT-BK/2P-PNL	Ready™ Wall Mount Building Enclosure, 2P, black
760147504	WBE-EMT-BK/4P-PNL	Ready™ Wall Mount Building Enclosure, 4P, black
760147512	WBE-EMT-BK/8P-PNL	Ready™ Wall Mount Building Enclosure, 8P, black

STANDARD READYPATCH PRE-TERMINATED MODULES

Material ID	Product Number	Description
760039685	RFE-MOD-024-5L-MPO-LC02	24F, LC, Laser Optimized, 50 µm, Multimode
760044818	RFE-MOD-024-6F-MPO-LC02	24F, LC, 62.5 µm, Multimode
760039701	RFE-MOD-024-8W-MPO-LC02	24F, LC, Single-mode
760039727	RFE-MOD-012-5L-MPO-LC02	12F, LC, Laser Optimized, 50 µm, Multimode
760039768	RFE-MOD-012-5L-MPO-SC02	12F, SC, Laser Optimized, 50 µm, Multimode
760044826	RFE-MOD-012-6F-MPO-LC02	12F, LC, 62.5 µm, Multimode
760044834	RFE-MOD-012-6F-MPO-SC02	12F, SC, 62.5 µm, Multimode
760039743	RFE-MOD-012-8W-MPO-LC02	12F, LC, Single-mode
760039784	RFE-MOD-012-8W-MPO-SC02	12F, SC, Single-mode

KEYED READYPATCH PRE-TERMINATED MODULES

Material ID	Product Number	Description
760039685	RFE-MOD-024-5L-MPO-LC02	24F, LC, Laser Optimized, 50 µm, Multimode
760087593	RFE-MOD-024-5L-MPO-LC02-KGR	24F, LC, Laser Optimized, 50 µm, Multimode, Keyed green
760094615	RFE-MOD-024-5L-MPO-LC02-KRD	24F, LC, Laser Optimized, 50 µm, Multimode, Keyed red
760094623	RFE-MOD-024-5L-MPO-LC02-KYL	24F, LC, Laser Optimized, 50 µm, Multimode, Keyed yellow
760087551	RFE-MOD-024-6F-MPO-LC02-KBL	24F, LC, 62.5 µm, Keyed blue
760087619	RFE-MOD-024-6F-MPO-LC02-KGR	24F, LC, 62.5 µm, Keyed green
760087700	RFE-MOD-024-6F-MPO-LC02-KRD	24F, LC, 62.5 µm, Keyed red
760087734	RFE-MOD-024-6F-MPO-LC02-KYL	24F, LC, 62.5 µm, Keyed yellow
760087544	RFE-MOD-024-8W-MPO-LC02-KBL	24F, LC, Single-mode, Keyed blue
760087601	RFE-MOD-024-8W-MPO-LC02-KGR	24F, LC, Single-mode, Keyed green
760087692	RFE-MOD-024-8W-MPO-LC02-KRD	24F, LC, Single-mode, Keyed red
760087726	RFE-MOD-024-8W-MPO-LC02-KYL	24F, LC, Single-mode, Keyed yellow
760087858	RFE-MOD-012-5L-MPO-LC02-KBL	12F, LC, Laser Optimized, 50 µm, Multimode, Keyed blue
760087916	RFE-MOD-012-5L-MPO-LC02-KGR	12F, LC, Laser Optimized, 50 µm, Multimode, Keyed green
760088005	RFE-MOD-012-5L-MPO-LC02-KRD	12F, LC, Laser Optimized, 50 µm, Multimode, Keyed red
760088039	RFE-MOD-012-5L-MPO-LC02-KYL	12F, LC, Laser Optimized, 50 µm, Multimode, Keyed yellow
760087874	RFE-MOD-012-6F-MPO-LC02-KBL	12F, LC, 62.5 µm, Keyed blue
760087932	RFE-MOD-012-6F-MPO-LC02-KGR	12F, LC, 62.5 µm, Keyed green
760088021	RFE-MOD-012-6F-MPO-LC02-KRD	12F, LC, 62.5 µm, Keyed red
760088054	RFE-MOD-012-6F-MPO-LC02-KYL	12F, LC, 62.5 µm, Keyed yellow
760087866	RFE-MOD-012-8W-MPO-LC02-KBL	12F, LC, Single-mode, Keyed blue
760087924	RFE-MOD-012-8W-MPO-LC02-KGR	12F, LC, Single-mode, Keyed green
760088013	RFE-MOD-012-8W-MPO-LC02-KRD	12F, LC, Single-mode, Keyed red
760088047	RFE-MOD-012-8W-MPO-LC02-KYL	12F, LC, Single-mode, Keyed yellow

FACEPLATES

Material ID	Product Number	Description
760100867	M11SP	1 Port Stainless Steel Faceplate
108615188	M12SP	2 port Stainless Steel Faceplate
108615196	M13SP 3	3 port Stainless Steel Faceplate
108615204	M14SP 4	4 port Stainless Steel Faceplate
108615212	M16SP 6	6 port Stainless Steel Faceplate
108258427	M10EW-262	1 Port Modular Outlet Wall Phone Faceplate, White
108258450	M10EW-246	1 Port Modular Outlet Wall Phone Faceplate, Ivory
108258419	M10L-246	1 Port Modular Faceplate
108168477	M12L-246	2 Port Modular Faceplate
108168519	M13L-246	3 Port Modular Flush-Mount Faceplate
108168550	M14L-246	4 Port Modular Flush-Mount Faceplate
108168592	M16L-246	6 Port Modular Flush-Mount Faceplate
108685017	M28L-246	8 Port Modular Flush-Mount Faceplate
108333006	M10LE-ivory	1 Port Designer Faceplate
108333055	M12LE-ivory	2 Port Designer Faceplate
108333105	M13LE-ivory	3 Port Designer Faceplate
108333154	M14LE-ivory	4 Port Designer Faceplate
108333204	M16LE-ivory	6 Port Designer Faceplate
760010017	M13FP-ivory	Flexible Single Gang faceplate
760008615	M26FP-ivory	Flexible Double Gang faceplate
760009472	M30FP-Blank-ivory	Flexible Adapter Blank
760009431	M30FP-1RJ45-ivory	Flexible Adapter Single Outlet
760008656	M30FP-2RJ45-ivory	Flexible Adapter Double Outlet
108564675	M13CLS-246	3 Port Multimedia Faceplate, Ivory (1.84 x 3.13 x 0.29 in)
108564683	M13CLS-262	3 Port Multimedia Faceplate, White (1.84 x 3.13 x 0.29 in)
108564691	M13CLS-270	3 Port Multimedia Faceplate, Gray (1.84 x 3.13 x 0.29 in)
108564709	M13CLS-003	3 Port Multimedia Faceplate, Black (1.84 x 3.13 x 0.29 in
108168477	M13CLS-215	3 Port Multimedia Faceplate, Cream (1.84 x 3.13 x 0.29 in)
106650864	M13C-003	3 Port Modular Furniture Faceplate, Black (1.84 x 3.13 x 0.29 in)
106650880	M13C-246	3 Port Modular Furniture Faceplate, Ivory (1.84 x 3.13 x 0.29 in)
106650898	M13C-262	3 Port Modular Furniture Faceplate, White (1.84 x 3.13 x 0.29 in)
106701154	M13C-270	3 Port Modular Furniture Faceplate, Gray (1.84 x 3.13 x 0.29 in)
108216151	M14CE-003	4 Port Modular Furniture Faceplate, Ivory (2.16 x 4.07 x 1.27 in)
108216128	M14CE-262	4 Port Modular Furniture Faceplate, White (2.16 x 4.07 x 1.27 in)
108216136	M14CE-270	4 Port Modular Furniture Faceplate, Gray (2.16 x 4.07 x 1.27 in)
108216151	M14CE-003	4 Port Variable Furniture Faceplate, Black (2.16 x 4.07 x 1.27 in)
700191570	M4CA-246	4 Port Variable Furniture Faceplate, Ivory (2.98 x 3.28 x 0.5 in)
700191588	M4CA-262	4 Port Variable Furniture Faceplate, White (2.98 x 3.28 x 0.5 in)
700191596	M4CA-270	4 Port Variable Furniture Faceplate, Gray (2.98 x 3.28 x 0.5 in)

XXX = Color:
Black = 003, White = 262, Ivory = 246, Gray = 270, Cream = 215

25 Appendix C1 – Sapphire Clean Agent Fire Suppressions System

Background:
The Calgary Airport Authority (the Authority) has installed a Sapphire Clean Agent fire suppression system in many of its main server and telecommunications rooms. Sapphire is a Clean Agent fire suppression product offering supplied by the ANSUL Company. ANSUL is a division of the Simplex\Grinnell Company. The clean agent itself is known as NOVEC 1230 and is manufactured by the 3M Company. Please see the following WEB sites for more information.

http://www.ansul.com/en/Products/clean_agent_systems/sapphire.asp
http://solutions.3m.com/wps/portal/3M/en_US/Novec/Home/Product_Information/Fire_Protection/

The system was installed to eliminate the risk posed by the discharge of a water based fire suppression system on the electronic systems located in these rooms.

All locations, with the exception of SB203 are located in the Main Terminal Buildings. SB203 is located in the Services Building.

Expectations of Technicians working in these rooms:
To protect the room properly, the Sapphire system requires that the rooms in which it is installed be nearly air tight. This requirement results in special requirements and expectations for technicians working in these particular Server and Telecommunications rooms to confirm door sweeps are in place, ceiling tiles are complete and in place and cable pathways are fire stopped.

How to determine you are in a room protected by the Sapphire system:
All locations that have been outfitted with the Sapphire system will have signage on all access doors. The existence of this signage will alert you that you are entering a room that is being protected by the Sapphire system. There are two signs. The first sign is a red and white sign. It states in English and French:

Authorized Persons Only; Restricted Area

The second sign is silver with black lettering and is located directly below the sign noted just above. It states, in English only:

Warning.
This space is protected by a Sapphire Fire Suppression system.
When system is discharged as a result of fire, caution should be taken to avoid the products of combustion.
Do not enter without approved self-contained breathing apparatus or until area is properly ventilated.
Sapphire Suppression Systems.

Additionally, located just above the door on the wall or the ceiling will also be an amber strobe. This strobe will activate upon a discharge of the system.

Accessing the above ceiling panels to complete your work:
Access Panels:
In rooms with drop ceilings, careful review of the underside of the ceiling will reveal that Access Panels, marked with a green dot, have been strategically located in these rooms. The intent of these panels is to allow access to the ceiling spaces. Use of these panels will always be the first and preferred approach to accessing the above panel ceiling spaces.
These panels are to be removed only as long as required and:

- Absolutely must not remain removed overnight.
- Absolutely must not remain removed while the technician(s) is\are absent for any reason, even short absences such as five of ten minutes in duration (washroom or smoke breaks for example).

The Access Panels are made from drywall and are heavy enough that they don't require any clipping or other special treatment to ensure they stay in place during a discharge.

All standard ceiling panels have been clipped down (exclusive of Access Panels). No clipped panels are to be removed without the written authorization and consent of the Calgary Airport Authority.

A Service Request (TSR) is required when clipped ceiling panels are to be removed. The form can be found at WWW.YYC.COM – Forms & Applications. In your request, be sure to provide your specific rational stating why a clipped panel must be removed and why the work cannot be completed using one of the provided access points. An inspection is required at the completion of your work for final sign-off by the Authority.

IT Service Desk contact information: itservicedesk@yyc.com or 403 735 1230.

Cable penetrations:
Where there are penetrations into the room for cable access, the Authority has installed EZ PATH 33 and 44 series fire rated pathway system to ensure that room integrity is maintained. These fire rated pathway system meet the Authorities fire stopping requirements when used as directed by the manufacturer. See this WEB Site for more information.

http://www.stifirestop.com/products/ez-path/

Please reference **Appendix –C2 FIRESTOPPING**

For EZ PATH fire rated pathway system, please see Appendix-C2 for product and installation details.

ABORT Button:
On the inside of the room, co-located with the exit door will be a deadman ABORT button. This button can be used to abort the discharge of the system upon accidental discharge. This is a deadman button. To avoid a discharge, the button must be pushed and held down until a member of the Fire Department has an opportunity to completely cancel the discharge at the fire panel.

Health effects of being exposed to NOVEC 1230:
There are no adverse health effects of being exposed to the NOVEC 1230 fire suppression fluid. Please see the MSD sheets co-located with each of the Sapphire Suppression systems in the Main Terminal and Services buildings or in the appendixes of this document.

ANSUL® ANSUL INCORPORATED MARINETTE, WI 54143-2542

3M™ NOVEC™ 1230 FIRE PROTECTION FLUID MATERIAL
SAFETY DATA SHEET CONFORMS TO DIRECTIVE 2001/58/EC

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

1.1. Identification of the preparation

Product Name:	"3M™ Novec™ 1230 Fire Protection Fluid
Chemical Name:	1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone.
CAS No.:	756-13-8.
Chemical Formula:	$CF_3CF_2C(O)CF(CF_3)_2$.
EINECS Number:	Product complies with chemical notification requirements.
NOTE:	"3M" and "Novec" are Trademarks of the 3M Company.

1.2. Use of the preparation

The intended or recommended use of this preparation is as a FIRE EXTINGUISHING AGENT.

1.3. Company identification

Manufacturer/Supplier:	ANSUL INCORPORATED
Address:	One Stanton Street, Marinette, WI 54143-2542
Prepared by:	Safety and Health Department
Phone:	715-735-7411
Internet/Home Page:	http://www.ansul.com
Date of Issue:	September, 2009

1.4. Emergency telephone

CHEMTREC 800-424-9300 or 703-527-3887

2. COMPOSITION/INFORMATION ON INGREDIENTS

2.1. Ingredient Name:	1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone.
Chemical Formula:	$CF_3CF_2C(O)CF(CF_3)_2$.
CAS No.:	756-13-8.
EINECS Number:	Product complies with chemical notification requirements.
Concentration, Wt %:	> 99.9 %.
Hazard Identification:	See Heading 3.

2.2. (i) There are NO substances presenting a health or environmental hazard within the meaning of Directive 67/548/EEC, in concentrations equal to or greater than those laid down in the table set out in Article 3 (3) of Directive 1999/45/EC, nor with lower limits given in Annex I to Directive 67/548/EEC or in Annexes II, III or V to Directive 1999/45/EC.

(ii) There are NO substances for which there are Community workplace exposure limits, which are not already included in (i) above.

NOTE: Unless a component presents a severe hazard, it does not need to be considered in the MSDS if the concentration is less than 1%. [According to Directive 1999/45/EC.]

3. HAZARDS IDENTIFICATION

FOR HUMANS:
EU Classification: This product is not classified as dangerous according to Directive 1999/45/EC.

Limit Values for Exposure:
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone

TWA Limit:	150 ppm.	Limit set by 3M Company.

Neither this preparation nor the substances contained in it have been listed as carcinogenic by National Toxicology Program, I.A.R.C., or OSHA.

AS PART OF GOOD INDUSTRIAL AND PERSONAL HYGIENE AND SAFETY PROCEDURE, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes, and clothing. DO NOT eat, drink or smoke when using this product.

SIGNS AND SYMPTOMS:

Acute Exposure:

Eye Contact:	Contact with the eyes during product use is not expected to result in significant irritation.
Skin Contact:	Contact with the skin during product use is not expected to result in significant irritation.
Inhalation:	Prolonged or repeated exposure, above recommended guidelines, may be absorbed following inhalation and cause target organ effects.
Ingestion:	No health effects are expected.
Chronic Overexposure:	Prolonged or repeated exposure, above recommended guidelines may cause liver effects. Signs or symptoms may include loss of appetite, weight loss, fatigue, weakness, abdominal tenderness, and jaundice.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: None known.

FOR ENVIRONMENT:

NO harm to the environment is expected from an accidental release of this preparation. See Heading 12 ECOLOGICAL INFORMATION.

4. FIRST AID MEASURES

Eye Contact:	Flush eyes with large amounts of water. If signs or symptoms persist, get medical attention.
Skin Contact:	Wash affected area with soap and water. If signs or symptoms persist, get medical attention.
Inhalation:	If signs or symptoms develop, remove person to fresh air. If signs or symptoms persist, get medical attention.
Ingestion:	Do not induce vomiting. Give victim two glasses of water. Never give anything by mouth to an unconscious person. If signs or symptoms develop, get medical attention.

5. FIRE-FIGHTING MEASURES

This preparation is a fire extinguishing agent.

There are NO extinguishing media which must not be used for safety reasons.

Fire fighters should wear full protective equipment (Bunker Gear) and a self-contained breathing apparatus (SCBA).

See Heading 10 STABILITY AND REACTIVITY for hazardous combustion and thermal decomposition information.

6. ACCIDENTAL RELEASE MEASURES

For personal protection: Prevent skin and eye contact, see Heading 8 EXPOSURE CONTROLS/PERSONAL PROTECTION.

Clean up: Ventilate the area with fresh air. Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Collect as much of the spilled material as possible. Clean up residue. Place in a metal container approved for transportation by appropriate authorities. Dispose of collected material as soon as possible. See Heading 13 DISPOSAL CONSIDERATIONS.

NO harm to the environment is expected from an accidental release of this preparation. See Heading 12 ECOLOGICAL INFORMATION.

In the event of a release of this material, the user should determine if the release qualifies as reportable according to local, state, and federal regulations.

7. HANDLING AND STORAGE

7.1. Handling

Avoid eye contact with vapors, mists, or spray. Avoid breathing of vapors, mists or spray.

Contents may be under pressure, open carefully.

See incompatibility information in Heading 10 STABILITY AND REACTIVITY.

7.2. Storage

Keep container in well-ventilated area.

See incompatibility information in Heading 10 STABILITY AND REACTIVITY.

Store in original container. Keep tightly closed until used.

There is minimal danger to the environment from a storage release. See Heading 12 ECOLOGICAL INFORMATION.

7.3. Specific use

The intended or recommended use of this preparation is as a FIRE EXTINGUISHING AGENT.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Exposure limit values

1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone

TWA Limit: 150 ppm. Limit set by 3M Company.

8.2. Exposure controls

Do not eat, drink or smoke when using this product.

8.2.1. Occupational exposure controls

8.2.1.1. Respiratory protection

Avoid breathing of vapors, mists or spray.

Under normal use conditions, airborne concentrations are not expected to be significant enough to require respiratory protection.

Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: Half facepiece or fullface air-purifying respirator with organic vapor cartridges.

Consult the current 3M Respiratory Selection Guide for additional information or call 1-800-243-4630 for 3M technical assistance.

If thermal decomposition occurs, wear supplied air respiratory protection.

8.2.1.2. Hand protection

Butyl Rubber gloves are recommended.

Select and use gloves and/or protective clothing to prevent skin contact based on the results of an exposure assessment. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible materials.

8.2.1.3. Eye protection

Indirect Vented Goggles are recommended.

8.2.1.4. Skin protection

Select and use gloves and/or protective clothing to prevent skin contact based on the results of an exposure assessment. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible materials.

8.2.2. Environmental exposure controls

There is minimal danger to the environment from a storage release. See Heading 12 ECOLOGICAL INFORMATION.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General information

Appearance:	Clear, colorless liquid.
Odor:	Low odor.

9.2. Important health, safety, and environmental information

pH:	Not applicable.
Boiling point/boiling range:	49.2 °C (120.6 °F).
Heat of vaporization @ boiling point:	88.0 kJ/kg (37.9 BTU/lb).
Freezing point:	–108 °C (–162.4 °F).
Flash point:	Not applicable.
Flammability (solid/gas):	Not applicable.
Explosive properties:	Not applicable.
Oxidizing properties:	Not an oxidizer.
Vapor Pressure:	244 mmHg, at 20 °C.
Relative Density (Water = 1):	1.6.
Solubility: — Water solubility:	<0.001 % by weight.
— Fat solubility:	Not determined.
Partition coefficient, n-octanol/water:	Not determined.
Viscosity:	0.6 centipoise, at 25 °C.
Vapor density (Air = 1):	11.6.
Evaporation rate (Butyl Acetate = 1):	> 1.

9.3. Other information

Auto-ignition temperature:	Not applicable.

10. STABILITY AND REACTIVITY

10.1. Conditions to avoid

Avoid direct sunlight and ultraviolet light.

There are NO other known conditions such as temperature, pressure, shock, etc., which may cause a dangerous reaction.

10.2. Materials to avoid

Strong bases, amines, or alcohols.

10.3. Hazardous decomposition products

Normally stable.

Hazardous polymerization will NOT occur.

Combustion or decomposition products include carbon monoxide, carbon dioxide, and hydrogen fluoride.

11. TOXICOLOGICAL INFORMATION

Product:

Toxicity Data:	Inhalation LC50 (rat)	>10 % v/v.
	NOAEL for cardiac sensitization	>10 % v/v.

12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Not determined.

12.2. Mobility

Product is highly insoluble in water and volatile. Normal use would not typically result in releases to aquatic environments.

12.3. Persistence and degradability

Photolytic half-life is 3 to 5 days. The persistent photolytic degradation product is trifluoroacetic acid.

12.4. Bioaccumulative potential

Not determined.

12.5. Other adverse effects

Ozone depletion potential:	None.
Photochemical ozone creation potential:	None.
Global warming potential:	1.

13. DISPOSAL CONSIDERATIONS

Not regulated as a hazardous waste by the EPA under RCRA.

Reclaim if feasible.

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF. Facility must be capable of handling halogenated materials.

As a disposal alternative, dispose of waste product in a facility permitted to accept chemical waste.

Dispose of in compliance with national, regional, and local provisions that may be in force.

No harm to the environment is expected from this preparation. See Heading 12 ECOLOGICAL INFORMATION.

14. TRANSPORT INFORMATION

Hazard Class or Division:	Not hazardous.
Label:	No special label required.
Emergency response guide page number:	Not applicable.

For additional transport information, contact Ansul Incorporated.

No harm to the environment is expected from this preparation. See Heading 12 ECOLOGICAL INFORMATION.

15. REGULATORY INFORMATION

EU Classification: This product is not classified as dangerous according to Directive 1999/45/EC.

Exposure Limit Values:
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone
TWA Limit: 150 ppm. Limit set by 3M Company.

EINECS Status: The component of this product has been notified to ELINCS (European List of Notified or New Chemical Substances). Certain restrictions apply. Contact your distributor for additional information.
EPA TSCA Status: All components are included in TSCA inventories or are exempt from listing.
Canadian DSL (Domestic Substances List): All components are included in the DSL or are exempt from listing.
The product also complies with the chemical notification requirements for Korea (KECI), Australia (AICS), Japan (METI), and China (CICS).

Environmental restrictions: None are known.
Restrictions on Marketing and Use: None are known.
Refer to any other national measures that may be relevant.

16. OTHER INFORMATION

(HMIS) HAZARDOUS MATERIAL IDENTIFICATION SYSTEM RATINGS:

HEALTH:	0	4. Severe Hazard
FLAMMABILITY:	0	3. Serious Hazard
REACTIVITY:	1	2. Moderate Hazard
		1. Slight Hazard
		0. Minimal Hazard

PROTECTION:
See Section 8. EXPOSURE CONTROLS/PERSONAL PROTECTION.

(WHMIS) CANADIAN WORKPLACE HAZARDOUS MATERIAL IDENTIFICATION SYSTEM RATINGS:
This product is rated: **Not Hazardous.**

Format is from directive 2001/58/EC.
There is no data in EINECS http://exb.jrc.it/existing-chemicals/
Data used to compile the data sheet is from 3M Material Safety Data Sheet, Jan. 21, 2004 and other product literature.
The EU Classification is in accordance with Directive 1999/45/EC.

17. DISCLAIMER

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT, BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ANSUL SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT.

MSDS available at http://www.ansul.com

TYCO FIRE SUPPRESSION & BUILDING PRODUCTS, MARINETTE, WI 54143-2542 715-735-7411 Form No. F-2003263-3

26 Appendix –C2 FIRESTOPPING

All IT pathways through floors or walls shall utilize the Specified Technologies EZ Path firestop solution. Low Voltage Tray systems are not to pass through fire rated floors or walls. Contractors are responsible to update any penetrations not meeting this YYC standard. All additions of new Cable, including voice, data and electrical cable shall utilize the fire rated EZ PATH pathway system from STI Technologies Inc. to ensure continued room integrity.

A Service Request (TSR) is required when penetration through an existing sleeve is required. The form can be found at WWW.YYC.COM – Forms & Applications. An inspection is required at the completion of your work for final sign-off by the Authority.

If, for some reason, the supplied cable sleeve approach will not meet your requirement, then it is the contractor's responsibility, as part of their site investigation activities, to inform the Authority project manager well in advance of the date (ideally four weeks or more) you will require the installation of the cable, so that alternative arrangements can be made. Installing a new EZ Path pathway could be used to resolve such situations.

It is also the contractor's responsibility, as part of their site investigation activities, to review and ensure that enough available cable sleeve capacity for your projected requirement exists. If additional capacity is required, then you must inform the Authority project manager well in advance of the date (ideally four weeks or more) you will require the capacity to be available.

A Construction Installation Permit (CIP) is required for all alterations to Authority buildings and facilities. The form can be found at WWW.YYC.COM – Forms & Applications. An inspection is required at the completion of your work for final sign-off by the Authority.

For EZ PATH fire rated pathway system, please see below for product and installation details.

PRODUCT DATA SHEET

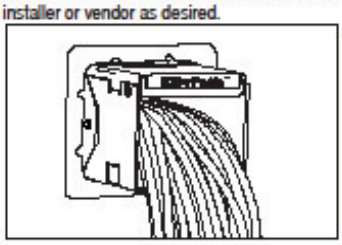
EZ PATH® SERIES 33 FIRE RATED PATHWAY

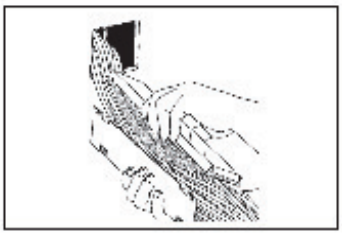
PRODUCT DATA SHEET

APPLICATIONS

EZ Path® Series 33 Fire Rated Pathway is designed for easy installation in floors and walls. Tested and approved cable capacities range from 0 to 100% visual fill. EZ Path® Series 33 Fire Rated Pathway when installed with available wall plates is designed for new cable installations. In these installations, the device does not require mechanical attachment to either the wall or the wall framing and may be installed after the wallboard has been installed. EZ Path's® split body design also allows the device to be easily disassembled and installed around previously installed cables in existing construction.

EZ Path® Series 33 Fire Rated Pathway provides exceptional cable capacity. A single unit installed in a wall exceeds the cable carrying capacity of a 4" (102 mm) sleeve utilizing typical putty firestop systems (35% cable loading). Multiple ganged devices utilizing available duplex, or triplex wall plates provide additional capacity or segregation of cables by use, type, installer or vendor as desired.





PRODUCT DESCRIPTION

The EZ Path® Fire Rated Pathway is a raceway device designed to allow cables to penetrate fire-rated walls and floors without the need for firestopping. This device features a built-in fire and smoke sealing system that automatically adjusts to the amount of cables installed. Once installed in a fire barrier, cables can be easily added or removed at any time without the need to remove or reinstall firestopping materials.

EZ Path® Series 33 Fire Rated Pathway consists of an enclosed heavy gauge galvanized steel raceway lined with intumescent material engineered for rapid expansion when exposed to fire or high temperatures, quickly sealing the pathway and preventing the passage of flames and smoke.

EZ Path® Series 33 Fire Rated Pathway is painted safety orange for easy identification. Its compact square profile allows a maximum number of cables to be installed in a relatively small area. The pathway measures approximately 3" x 3" and is 10.5" (76 x 76 x 267 mm) long.

FEATURES

- **Easy to install.**
- **No firestopping required.**
- **Firestopped at all stages of use.**
- **UL Tested - Low Leakage!**
- **UL Classified for the complete range of its capacity.**
- **Wireways can be ganged for additional capacity.**
- **Permits cable segregation by use, type, vendor.**
- **Match the capacity of a 4" (102 mm) conduit.**

PERFORMANCE

EZ Path® is UL Tested and Classified in accordance with ASTM E814 (UL1479). Systems are available for common floor and wall constructions with ratings up to and including 4 hours.

Firestop Device for use in through-penetration firestop systems. See UL directory of products certified for Canada and UL fire resistance directory.

SPECIFICATIONS

All data, video, and communications cable bundles shall utilize an enclosed fire-rated pathway device wherever said cables penetrate rated walls. The fire-rated pathway shall contain a built-in fire sealing system sufficient to maintain the hourly fire rating of the barrier being penetrated. The self-contained sealing system shall automatically adjust to the installed cable loading and shall permit cables to be installed, removed, or retrofitted without the need to remove or reinstall firestop materials. The pathway shall be UL Classified and/or FM Systems Approved and tested to the requirements of ASTM E814 (UL1479).

SPECIFIED DIVISIONS

DIV.	7	07840	Through-Penetration Firestopping
DIV.	16	16050	Basic Electrical Materials & Methods

PRODUCT DATA SHEET

INSTALLATION INSTRUCTIONS

UL Classified Systems presently cover installations in framed gypsum board walls as well as masonry walls and floors with ratings of up to four hours.

Installation in walls for new cabling installations utilizes one to seven devices with appropriate wall plates and gaskets (See Table C - Required Components). Wall plates are secured to raceway using an allen wrench provided by the manufacturer with each kit. Installation is easily and quickly accomplished using the following steps:

1. Measure and cut a suitably sized square or rectangular opening through wall (See Table A for required opening dimensions).
2. Using gauge marks conveniently stamped on the device lid, pre-position and fasten one wall plate to raceway (See Fig. 1).
3. Using wall plate gaskets (provided) insert raceway through wall (See Fig. 2).
4. Working from the opposite side of the wall, install remaining gasket and wall plate to complete the installation.

Wall installation for existing cables

1. For normal sized openings, the opening is squared off and a single EZD33FWS pathway is installed in the wall. The periphery is sealed using SpecSeal® Firestop Sealant. Optional positioning clamps (See Table D: ORDERING INFORMATION) position and secure the device within the wall prior to caulking (See FIG. 3).
2. For oversized openings, the EZDP33WR kit is recommended. The kit provides an EZ Path® device, gasket and wall plates. Detailed installation instructions are provided with the kit.

TABLE A: WALL OPENING DIMENSIONS					
CONFIGURATION	SINGLE	DOUBLE	TRIPLE	FOUR	SEVEN
Square or Rectangular Using Wall Plates - Gypsum Board or Masonry					
Opening Height	3-1/8" (79 mm)	3-1/8" (79 mm)	3-1/8" (79 mm)	3-1/8" (79 mm)	3-1/8" (79 mm)
Opening Width	3-1/8" (79 mm)	6-1/8" (156 mm)	9-1/8" (232 mm)	12-1/8" (308 mm)	21-1/8" (537 mm)
Square (Using Sealant - No Wall Plates) - Gypsum Board or Masonry					
Opening Height	3-1/8" (79 mm)	N/A	N/A	N/A	N/A
Opening Width	3-1/8" (79 mm)	N/A	N/A	N/A	N/A
Round (Using Sealant - No Wall Plates) - Masonry					
Opening Diameter	4" (102 mm)	N/A	N/A	N/A	N/A

TABLE B: TECHNICAL DATA	
Shell Composition	0.059" Gal. Steel (1.5 mm)
Cable Loading Area	6 sq. in. (nom.) 39 cm²
Allowable Cable Fill	100% Visual
Total Leakage Area	0.0065 ft²* (0.0006 m²)
Wall Area Required (ft² / Device)	6.52* (0.61 m²)
Fire Resistance Ratings	1,2,3, and 4 Hour
Expansion Begins	350° F (177°C)
Volume Expansion	800%
Sample Cable Volume (Cat 5)	120 (nom.)
In-Service Temp.	-10°F (-23°C) - 120°F (49°C)
Storage Temp.	Less than 120°F (49°C)
Shelf Life	No Limit
*Per UBC 905.2.3 @ 100% Visual Fill	

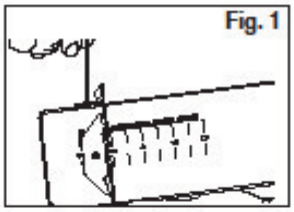


Fig. 1

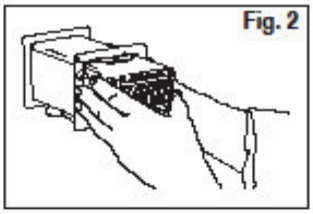


Fig. 2

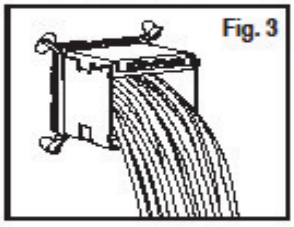


Fig. 3

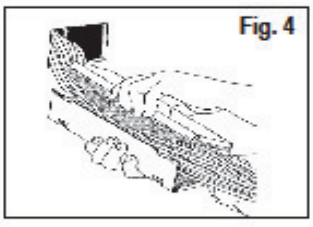


Fig. 4

CABLE INSTALLATION

Cables may easily be added or removed at any time without removing or reinstalling the fire seal. Cables may be added individually or in bundles. Wrapping ends with a low-friction tape facilitates cable insertion. A self-adjusting cable throat automatically adjusts to accommodate the cable bundle as it passes through the raceway. To minimize smoke leakage, it is recommended that cables be distributed evenly across the bottom of the raceway and built up in even layers.

TABLE C: REQUIRED COMPONENTS

	All Components Included	Raceway	Plate Kits
New Cable Installation Using Wallplates			
Single Raceway (Complete Kit)	(1) EZDP33FWS		
Single Raceway	N/A	(1) EZD33FWS	(1) EZP133W
Double Raceway	N/A	(2) EZD33FWS	(1) EZP233W
Triple Raceway	N/A	(3) EZD33FWS	(1) EZP333W
Four Gang Raceway	N/A	(4) EZD33FWS	(1) EZP433W
Seven Gang Raceway	N/A	(7) EZD33FWS	(1) EZP733W
New / Existing Cable Installation Using Sealant			
Single Raceway	N/A	(1) EZD33FWS	(1) EZP133PC
Existing Cable Installations (Retro-Fit)			
Single Pathway (Complete Kit)	(1) EZDP33WR	N/A	N/A

MAINTENANCE

No maintenance of the pathway is normally required. The interior of the device should be inspected before and after any modifications to the cable bundle. If any damage to the intumescent pads lining the top and bottom of the pathway is found, contact the factory to obtain replacements.

TECHNICAL SERVICE

Technical information including Product Data Sheets, Installation Instructions, applicable UL Classified Systems, Certificates of Conformance, and suggested specifications are available at the company's web site (www.stifirestop.com). For all other information, contact the manufacturer directly by dialing (800) 992-1180.

PRECAUTIONARY INFORMATION

The use of this device is subject to local, regional and national codes. Consult the local Building Code Official or Authority Having Jurisdiction regarding any regional or local requirements that might influence the selection or use of this product.

AVAILABILITY

See Table C - Required Components and Table D - Ordering Information. EZ Path Fire-Rated Pathway Products are available from designated authorized STI distributors. Consult the factory or visit the web site (www.stifirestop.com) for the names and locations of the nearest sales representatives or distributors.

* For new cabling installations. Retrofitting existing cable installations may require firestop sealant. See INSTALLATION.

PRODUCT DATA SHEET

(AVAILABILITY CONTINUED)

TABLE D: ORDERING INFORMATION

CAT. NO.	DESCRIPTION
EZDP33FWS	Single Device, full kit includes wall plates & labels.
EZDP33WR	Single Device, Retro-fit kit includes wall plates & labels.
EZD33FWS	Fire Rated Pathway Device.
EZD22	Single Mini Device, full kit includes wall plates & labels.
EZP133W	One pair (2) single mounting plates with wall labels.
EZP233W	One pair (2) double mounting plates with wall labels.
EZP333W	One pair (2) triple mounting plates with wall labels.
EZP433W	One pair (2) four gang mounting plates with wall labels.
EZP733W	One pair (2) seven gang mounting plates with wall labels.
RCM33	One Pair (2) radious control modules.
EZP133K	One single Kick-In plate.
EZP133R	One pair (2) retro-fit plates.
EZP133PC	One pair (2) positioning clamps.
SSS100	SpecSeal Intumescent sealant 10.1 oz. tube.
LCI300	SpecSeal Intumescent sealant 10.1 oz. tube.
PEN300	Pensil Silicone sealant 10.3 oz. tube.

City of New York MEA 369-02-M

Additional SpecSeal Products...

Series SSS Sealant

The industry's most versatile sealant provides the firestopping solutions for a wide range of combustible and noncombustible applications. Water-based intumescent sealant expands up to 8X!

Intumescent Wrap Strips

Two grades of intumescent wrap strips provide an unmatched combination of flexibility, economy, and expansion (up to 30X). Systems for plastic pipes including FR Polypropylene up to 8" trade size!

SSC & LCC Firestop Collars

Easy to install, economical protection for ABS and PVC pipes (both solid and foam core) as well as CPVC, PVDF, and FRPP. LCC Collars are available up to 4" and SSC Collars are available up to 6" trade size.

Firestop Mortar

Lightweight, versatile and economical! The best choice for large or complex installations.

SSP Firestop Putty

Available both in bar form and in pads, putty provides easy retrofit for through-penetrations and economical protection for electrical boxes.

Pensil® Silicone

Sealants and foam for through-penetrations and construction joints. Unexcelled aging characteristics and flexibility.

Elastomeric Joint Seals

New economical products for sealing construction joints. Choose caulk or spray applied products tested to UL2079.

Specified Technologies Inc.

Specified Technologies Inc. • 200 Evans Way, Somerville NJ 08876 • Phone: 800.992.1180 • Fax: 908.526.9623

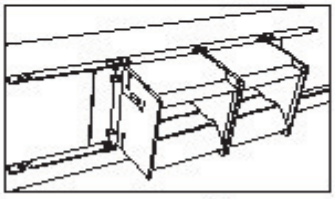
PRODUCT DATA SHEET

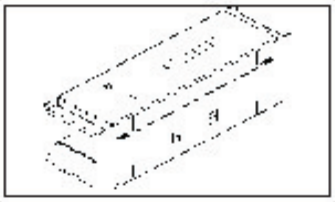
EZ-PATH® SERIES 44 FIRE RATED PATHWAY

APPLICATIONS

EZ-PATH® Series 44 Fire Rated Pathway Fire Rated Pathway is designed for easy installation in floors and walls. Tested and approved cable capacities range from 0 to 100% visual fill. EZ-PATH® Series 44 Fire Rated Pathway Fire Rated Pathway when installed with available single wall plates is designed for new cable installations. In these installations, the device does not require mechanical attachment to either the wall or the wall framing and must be installed after the wallboard has been installed. Split floor plates and multi-gang wall and floor brackets permit installation around previously installed cables if so desired. These installations require mechanical attachment to the barrier. A list of available accessories along with their intended use is shown below.

EZ-PATH® Series 44 Fire Rated Pathway Fire Rated Pathway provides exceptional cable capacity. A single unit installed in a wall exceeds the cable carrying capacity of a 6" (152 mm) sleeve utilizing typical putty firestop systems (35% cable loading). Multiple ganged pathways utilizing available wall bracket kits provide additional capacity or segregation of cables by use, type, installer or vendor as desired.





PRODUCT DESCRIPTION

The EZ-PATH® Series 44 Fire Rated Pathway Fire Rated Pathway is a raceway device designed to allow cables to penetrate fire-rated walls and floors without the need for firestopping. This device features a built-in fire and smoke sealing system that automatically adjusts to the amount of cables installed. Once installed in a fire barrier, cables can be easily added or removed at any time without the need to remove or reinstall firestopping materials.

The EZ-PATH® Series 44 Fire Rated Pathway Fire Rated Pathway consists of an enclosed heavy gauge galvanized steel pathway lined with intumescent material engineered for rapid expansion when exposed to fire or high temperatures, quickly sealing the pathway and preventing the passage of flames and smoke. EZ-PATH® Series 44 Fire Rated Pathway is painted safety orange for easy identification. Its compact square profile allows a maximum number of cables to be installed in a relatively small area. The pathway measures approximately 4" x 4 5/8" and is 14" long (102 x 118 x 356 mm).

FEATURES
- Easy to install.
- No firestopping required.
- Firestopped at all stages of use.
- UL Tested - Low Leakage!
- UL Classified for the complete range of its capacity.
- New interlocking design for easy gang installations.
- Permits cable segregation by use, type, vendor.
- More than *TWICE* the capacity of Standard EZPATH 33.

PERFORMANCE

EZ-Path® is UL Tested and Classified in accordance with ASTM E814 (UL1479). Systems are available for common floor and wall constructions with ratings up to and including 4 hours.

c UL us 3L73	FILL, VOID OR CAVITY MATERIALS CLASSIFIED BY UNDERWRITERS LABORATORIES INC. @ FOR USE IN THROUGH-PENETRATION FIRESTOP SYSTEMS. SEE UL FIRE RESISTANCE DIRECTORY CLASSIFIED FILL, VOID, OR CAVITY MATERIALS FOR USE IN THROUGH-PENETRATION FIRESTOP SYSTEMS. SEE UL DIRECTORY OF PRODUCTS CERTIFIED FOR CANADA AND UL FIRE RESISTANCE DIRECTORY	FM APPROVED

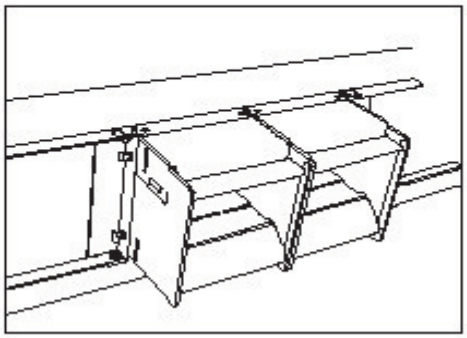
SPECIFICATIONS

All data, video, and communications cable bundles shall utilize an enclosed fire rated pathway device wherever said cables penetrate rated walls. The fire-rated pathway shall contain a built-in fire sealing system sufficient to maintain the hourly fire rating of the barrier being penetrated. The self-contained sealing system shall automatically adjust to the installed cable loading and shall permit cables to be installed, removed, or retrofitted without the need to remove or reinstall firestop materials. The pathway shall be UL Classified and/or FM Systems Approved and tested to the requirements of ASTM E814 (UL1479).

SPECIFIED DIVISIONS

DIV. 7	07 84 00 Penetration Firestopping
DIV. 26	26 00 00 Electrical
DIV. 27	27 00 00 Communications

PHYSICAL PROPERTIES	
Dimensions:	4" w x 4 5/6"H x 14" L (102 x 118 x 356 mm)
Shell Composition:	0.059" (1.5 mm) thick galv. steel
Cable Loading Area:	3 1/8" x 3 3/4" (79 x 95 mm)
Allowable Cable Fill:	0 to 100% visual fill
Fire Ratings:	1, 2, 3 or 4 hours
Expansion Begins:	350°F (177°C)
Volume Expansion:	800%
Sample Cable Volume:	244 (Cat 5)
In-Service Temperature:	Not to exceed 120°F (49°C)
Shelf Life:	No Limit



Available Components:

Complete single pathway kits including pathway, wall plates, gaskets, and barrier labeling are available. Pathways and accessories may also be purchased separately as noted below. Suitable fasteners for attaching wall plates may be required and must be purchased separately.

Individual Components & Accessories

Pathway: EZ-Path® 44 Device (EZD44) available as 4 pack.

Single Floor Plate: The single floor plate (EZP144F) is used to install a single pathway in a nominal 6" (152 mm) diameter hole in concrete floors. This plate is split to accommodate existing cabling and may also be used to retrofit cables in walls.

Multi Gang Wall Brackets: Multi gang wall brackets (EZP544W) allow one to five pathways to be installed in walls. Each pathway features a hook and eye locking mechanism that allows multiple pathways to be attached to one another. The multi gang wall brackets are installed around the devices. Multi gang wall brackets are also range-taking so that additional pathways may be added at a later date.

Multi Gang Floor Brackets: Multi gang floor brackets allow a grid of devices to be installed in larger openings in concrete floors. This unique installation consists of brackets and U-shaped channels that lock the devices into place in rows consisting of four pathways. Areas of the opening that will be activated later or saved for future use may be sealed with SpecSeal® Composite Sheet.

Complete Pathway Kits
(Include gasket(s) and barrier labeling)

Single Wall Pathway Kit: EZ-Path® 44 Device, two wall plates (EZDP44).

Single Floor Pathway Kit: EZ-Path® 44 Device, Split Floor Plate (EZDP144FK)

CABLE INSTALLATION

Cables may easily be added or removed at any time without removing or reinstalling the fire seal. Cables may be added individually or in bundles. Wrapping ends with a low-friction tape facilitates cable insertion. Avoid any sharp or exposed conductors that can potentially damage interior pads. A self-adjusting cable throat automatically adjusts to accommodate the cable bundle as it passes through the raceway. Installation of a pulling line will facilitate future cabling additions.

INSTALLATION INSTRUCTIONS

EZ-Path® 44 is designed for use in all common constructions. Single pathways and mounting hardware may be purchased separately or in complete kits. For multi-gang installations, pathways and appropriate mounting hardware must be purchased separately.
Single pathways may be installed in either square or round openings. Ganged pathways are designed to be installed in either square or rectangular openings appropriately sized for the number of units desired (See Installation Instructions). In gypsum board walls, where pathways are ganged, wall plates must be secured to the wall's internal studs.

MAINTENANCE

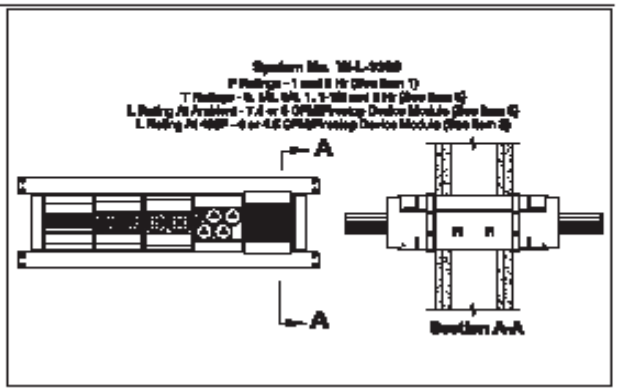
No maintenance of the pathway is normally required. The interior of the device should be inspected before and after any modifications to the cable bundle. If any damage to the intumescent pads lining the top and bottom of the pathway is found, contact the factory to obtain replacements.

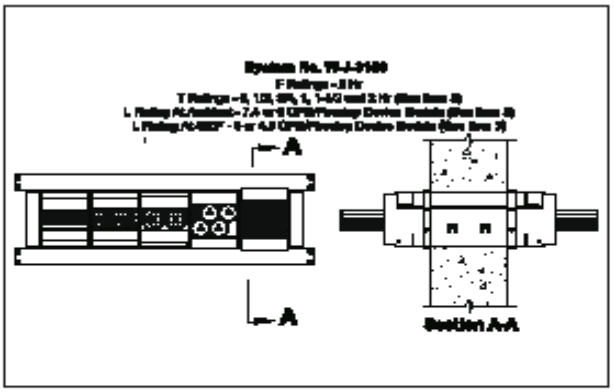
TECHNICAL SERVICE

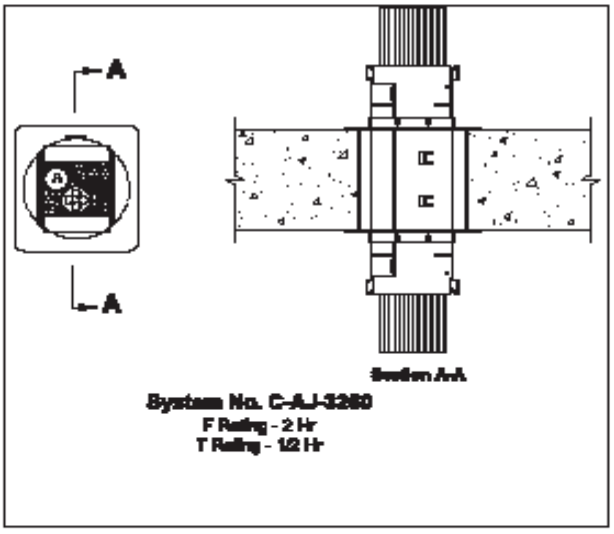
Technical information including Product Data Sheets, Installation Instructions, applicable UL Classified Systems, Certificates of Conformance, and suggested specifications are available at the company's web site (www.stifirestop.com). For all other information, contact the manufacturer directly by dialing (800) 992-1180.

PRECAUTIONARY INFORMATION

The use of this device is subject to local, regional and national codes. Consult the local Building Code Official or Authority Having Jurisdiction regarding any regional or local requirements that might influence the selection or use of this product.







AVAILABILITY

See Table A - Ordering Information. EZ-PATH® Fire-Rated Pathway Products are available from designated authorized STI distributors. Consult the factory or visit the web site (www.stifirestop.com) for the names and locations of the nearest sales representatives or distributors.

TABLE A: ORDERING INFORMATION

Catalog Number	Description
EZDP44	EZPATH 44 Fire-Rated Pathway Kit Full Kit with device, wall plates & labels
EZDP144FK	EZPATH 44 Fire-Rated Pathway Floor Kit Full Kit with device, floor plate & labels
EZP144W	One Pair (2) 44 single wall plate pack
EZP544W	44 5 gang wall plate brackets
EZP144F	44 Split floor plate pack
EZD44	Series 44 device
EZDG444	One (1) Included - Pathway Module (Four Pathways)
EZDG844	Two (2) Included - Pathway Module (Four Pathways)
EZDG1644	Four (4) Included Pathway Module (Four Pathways)
EZG844	Two (2) Purchase Separately - Pathway Module (Four Pathways)
EZG1644	Four (4) Purchase Separately - Pathway Module (Four Pathways)

CITY OF NEW YORK MEA 369-02-M

Additional EZ-PATH® Products...

Pathways
Easy installation and cable changes without firestopping! EZ-PATH is available in 3 sizes to accommodate your cabling needs. From MINI applications that hold up to 15 Cat. 6 cables, to our Standard 33 size that accommodates greater cable loading than a conventional 4" sleeve, EZ-PATH is the code-compliant solution designed to facilitate the installation of cables through fire-rated walls and floors.

Extension Module - Increase the pathway length for thicker walls by attaching the module to the end of a series 33 pathway. Extensions work with all other accessories in the 33 series.

Mounting Plates
Mounting plates are available for the standard 33 series in single, double, triple, four- and seven-gang installations. Additionally, plates are available for floor applications and applications where pathways are installed within 4" sleeves or conduits. Visit our website at www.stifirestop.com for complete accessories listing.

SSB Firestop Pillows
Durable, monolithic pillows for installations requiring quick and easy retrofitting.

CS Composite Sheet
Firestop panels designed to seal medium to large size openings with a variety of different penetrants in fire-rated floors and walls.

IMPORTANT NOTICE: All statements, technical information, and recommendations contained herein are based upon testing believed to be reliable, but the accuracy and completeness thereof is not guaranteed.

WARRANTY
Specified Technologies Inc. manufactures its goods in a manner to be free of defects. Should any defect occur in its goods (within one year), Specified Technologies Inc., upon prompt notification, will at its option, exchange or repair the goods or refund the purchase price.

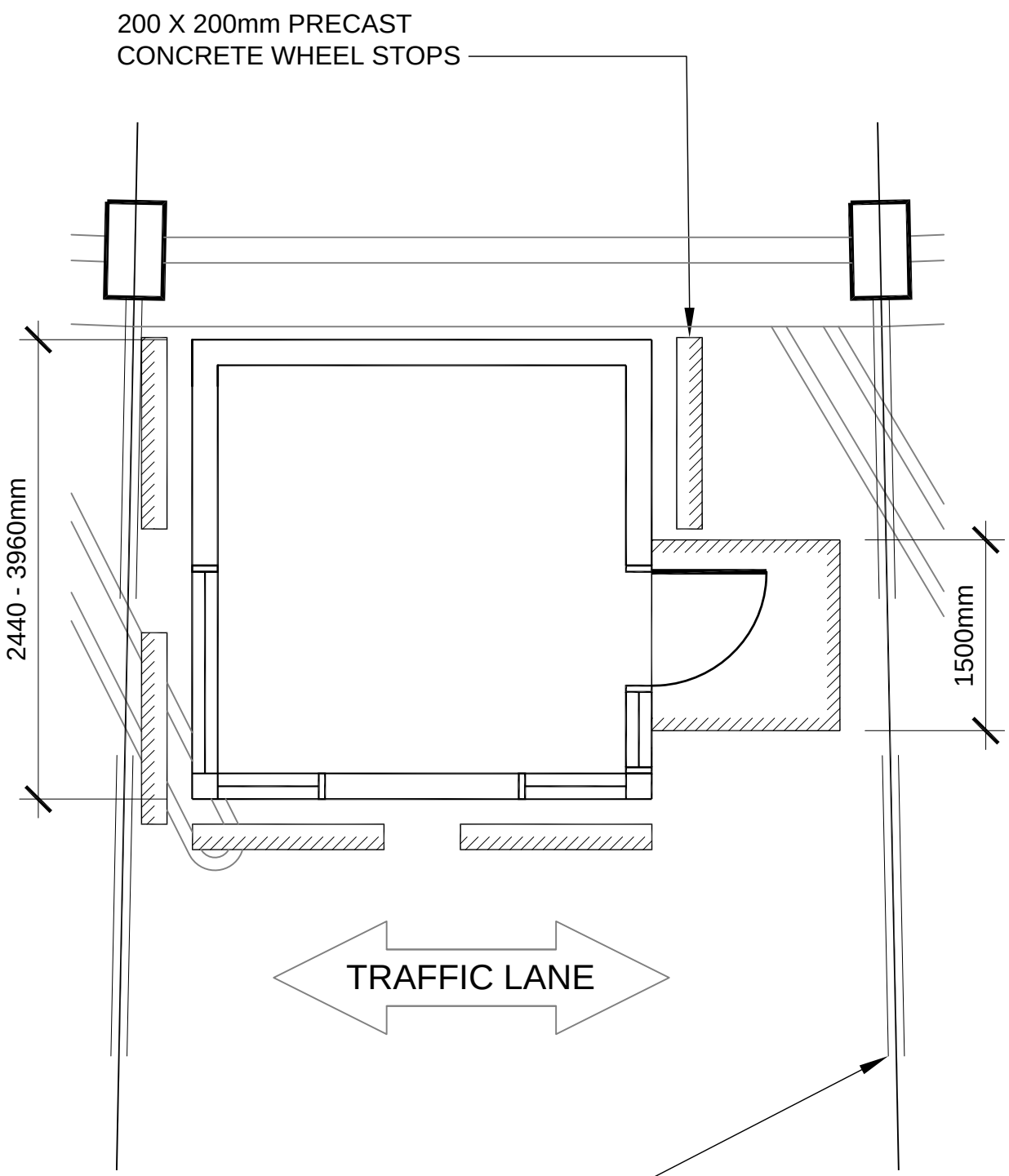
LIMITATIONS AND EXCLUSIONS:
THIS WARRANTY IS IN LIEU OF ALL OTHER REPRESENTATIONS EXPRESSED OR IMPLIED (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR USE) AND UNDER NO CIRCUMSTANCES SHALL SPECIFIED TECHNOLOGIES INC. BE RESPONSIBLE FOR ANY INCIDENTAL OR CONSEQUENTIAL PROPERTY DAMAGE OR LOSSES. PRIOR TO USE, THE USER SHALL DETERMINE THE SUITABILITY OF THE PRODUCT FOR ITS INTENDED USE, AND THE USER ASSUMES ALL RISKS AND LIABILITY FOR SUBSEQUENT USE.
No statement or recommendation not contained herein shall have any force or effect unless in an agreement signed by officers of seller and manufacturer.

Specified Technologies Inc.

Specified Technologies Inc. • 200 Evans Way, Somerville NJ 08876 • Phone: 800.992.1180 • Fax: 908.526.9823

**** END OF DOCUMENT ****

APPENDIX G –PARKADE RENTAL KIOSKS & LOT IDENTIFICATION DETAILS



TYPICAL PLAN

OWNER

YYC CALGARY AIRPORT AUTHORITY

PROJECT

CALGARY INTERNATIONAL AIRPORT

TENANT DESIGN GUIDLINES

PARKADE RENTAL KIOSKS

CADD FILE No.	PROJECT No.	DRAWN BY	SCALE	DATE	SHEET No.
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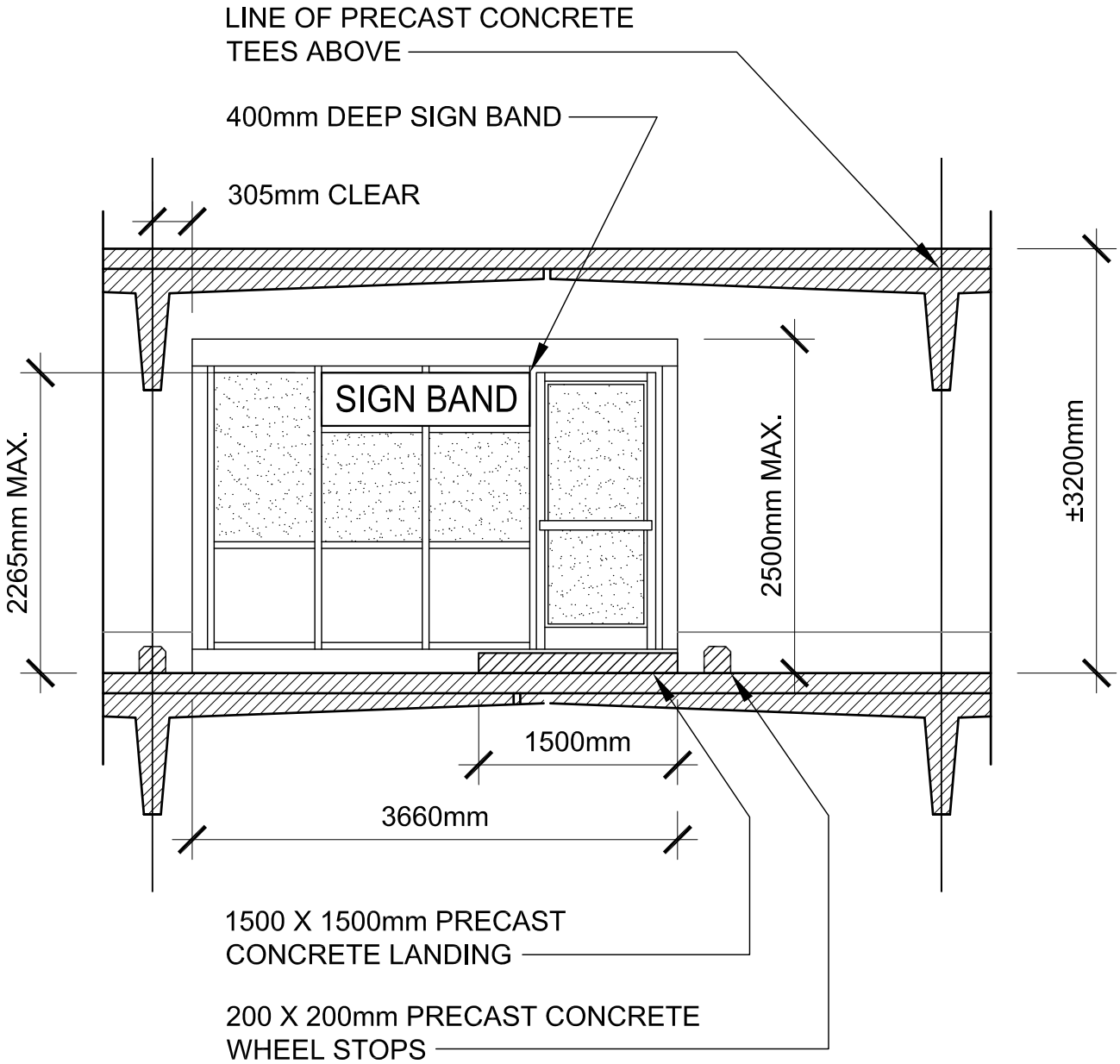

TYPICAL ELEVATION

OWNER

YYC CALGARY AIRPORT AUTHORITY

PROJECT

CALGARY INTERNATIONAL AIRPORT

TENANT DESIGN GUIDELINES

PARKADE RENTAL KIOSKS

CADD FILE No.	PROJECT No.	DRAWN BY	SCALE	DATE	SHEET No.
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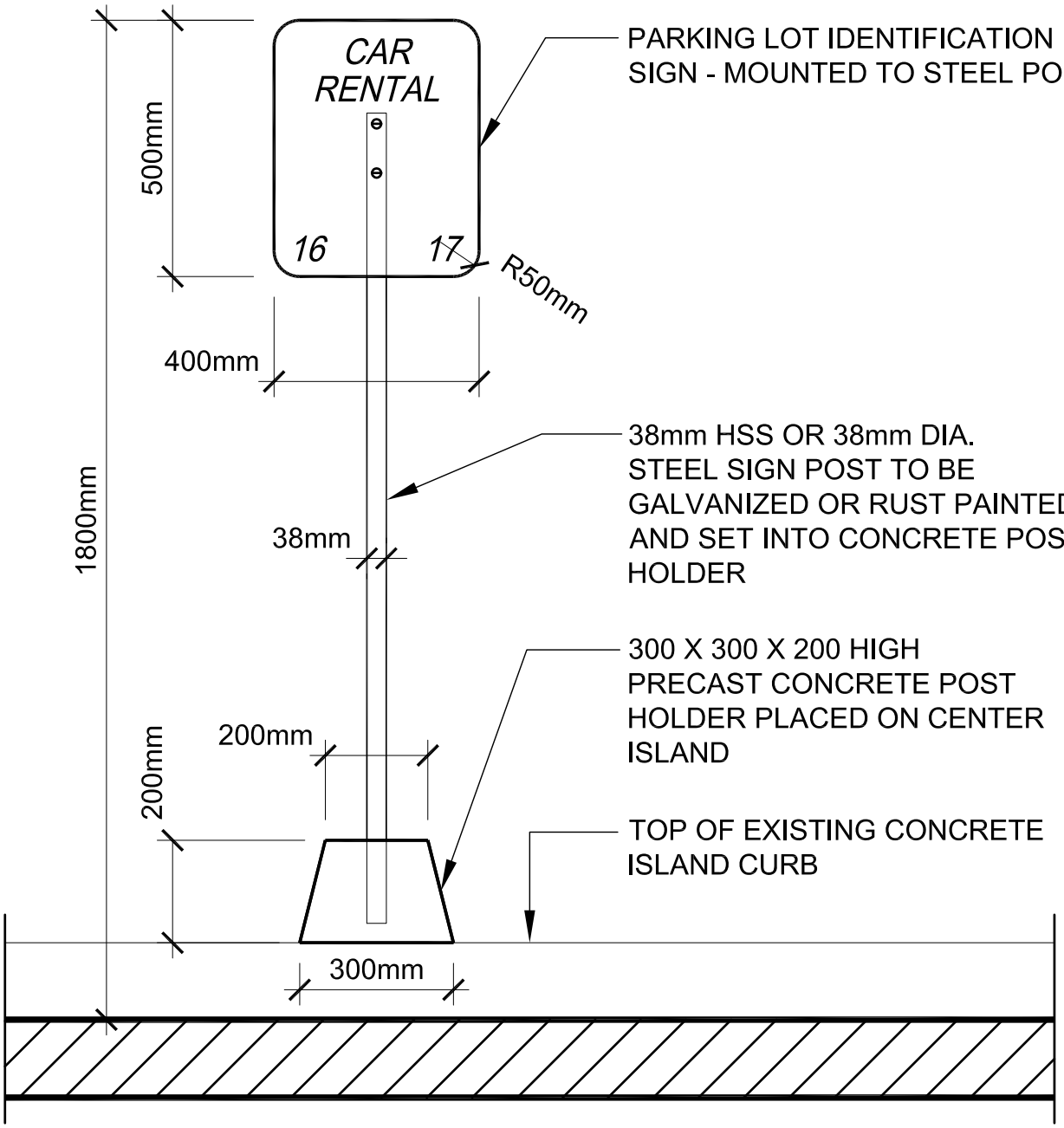

FRONT ELEVATION

OWNER

YYC CALGARY AIRPORT AUTHORITY

PROJECT

CALGARY INTERNATIONAL AIRPORT

TENANT DESIGN GUIDELINES

PARKING LOT IDENTIFICATION

CADD FILE No.	PROJECT No.	DRAWN BY	SCALE	DATE	SHEET No.
01U096.DWG	-	S.N.R.	N.T.S.	01.12.13	1 of 1

Name: 01u096.dwg Date: Apr 02, 2009 Time: 1:48 PM

APPENDIX H – ALBERTA STANDATA BULLETIN
21-ECB-004(rev1.0)

STANDATA bulletin 21-ECB-004(REV1)

Electrical

2021 Canadian Electrical Code, Part I, Section 4 - Conductors

Date Issued: June 2022

Purpose

This clarifies select rules of Section 4 of the Canadian Electrical Code, Part I (CE Code), which applies to conductors for services, feeders and photovoltaic circuits

Discussion

Rule 4-004 Ampacity of wire and cables

Underground Installations

The Appendix B note on this item references “defined assumptions”…

> *It is the intent of this Rule that where ampacities of underground installations of cable size 1/0 and larger are based on conditions of use other than those set out in the foregoing notes or the defined assumptions preceding them, they should be justified by precise calculation based on IEEE 835.*

While these assumptions are not detailed in the current code, they are referred to in Appendix B of the 1994 (seventeenth edition) as follows:

Unless stated otherwise, all Code references in this STANDATA are to the Canadian Electrical Code, Part I, 2021

Issued by the Provincial Electrical Administrator

[Original Signed]
Clarence C Cormier, P.Eng

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alberta.ca/electrical-standata.aspx

Assumptions used in the Calculation of Cable
Ampacity Rating for Direct Buried and Underground Conduit installations

General	
Load factor	*-100%*
Ambient Soil Temperature	*-20°C*
Conductor Temperature	*-90°C*
Soil Thermal Resistivity	*-90°C – CM Watt*
Insulation/Jacket Thermal Resistivity	*-400°C – CM Watt*
Shield or Sheath Operation	*-Open Circuit*
Voltage Rating	*-0 to 5 kV*
Direct Buried Installation	
Cable Depth of Burial	*-915mm (36")*
Cable Types	*-RWU90*
	-RA90
	-TECK90
	-ACWU90
Conduit Installation	
Diameter of Conduit	*-127mm (5")*
Depth of Concrete from Surface	*-760mm (30")*
Concrete Thermal Resistivity	*-85°C – CM Watt*
Cable Type	*-RW90*

In determining the maximum current which copper or aluminum conductors may carry in underground runs, paragraphs 1) d) *(for copper)* and 2) d) *(for aluminum)* of Rule 4-004 requires that, for conductors No. 1/0 American Wire Gauge (AWG) and larger, diagrams D8 to D11 and Tables D8A to D11B assist the Code user in determining the maximum conductor ampacity. The results arrived at when using diagrams D8 to D11and tables D8A to D11B are based on the assumptions above.

Otherwise, to determine precise maximum ampacities for conductors No. 1/0 AWG and larger, the detailed calculations in the Institute of Electrical and Electronics Engineers (IEEE) Standard 835 should be applied as advised in the Appendix B note to Rule 4-004.

Cable Arrangements

The Appendix B note to Rule 4-004 indicates where Tables D8A to D11B may be used to determine ampacities of conductors for the cable arrangements shown in diagrams D8 to D11. Where other cable configurations are used, the cable manufacturer or a registered engineering professional should be consulted to verify the cable ampacities.

Metallic vs. Non-metallic Raceway

Note (1) of Tables D9A and D9B refers to non-metallic underground raceways. These tables apply to an installation configuration of a single conductor per raceway. The values in the table do not take into consideration heating effects of circulating currents that would be imposed on metallic conduit, hence the reference to only non- metallic raceways.

Removal of Table 39

Users of the CE Code are reminded that Table 39 has been removed from the 2021 edition of the CE Code (Table 39 "Minimum permitted size for 3-wire 120/240 Volt and 120/208 Volt service conductors for single dwellings and feeder conductors or cables supplying single dwelling units of row housing, apartment, or similar

buildings and terminating on equipment having a conductor termination temperature of not less than 75° Celsius").

Rule 4-018 Size of neutral conductor

Neutral conductor size for single family dwellings

For a single family dwelling with provisions for a 120/240 volt electric range, a 120/240 volt electric dryer or other balanced loads, the neutral conductor of the consumer's service, or feeder, may be sized in accordance with Subrule 3).

This concept may be equally applied to a feeder or service supplying more than one unit of row housing or similar installations.

As explained in Rule 4-004 4), the common conductor of a consumer's service or feeder connected to each of two phase wires and the neutral of a 4-wire, 3-phase system carries approximately the same current as the other conductors and therefore must not be reduced.

Neutral overload from the effect of harmonics on a system

When designing an installation that will incorporate a number of electronic devices, a registered engineering professional should review the design to ensure conductors will not be subject to an overload condition due to harmonic effect.

Note: The standard averaging type clamp-on ammeter cannot measure the overload imposed on a system from the effect of harmonics accurately. A "True Root Mean Squared" (True RMS) type must be used.

Rule 4-022 Installation of identified conductor

Identified conductor An identified conductor is a conductor that has a white covering, or in the case of certain flexible cords, a raised longitudinal ridge. In either case, the identified conductor is the grounded circuit conductor or a neutral.

Pigtailing of identified conductor Where a device, such as a receptacle or a lampholder, is fed from a 2-wire circuit employing an identified conductor, pigtailing the identified conductor is not required. Where a device is fed from a multi-wire branch circuit employing an identified conductor, pigtailing of the identified conductor is required as per Rule 4-030 4).

Rule 4-032 Identification of insulated conductors

This rule allows for the use of red, black, & blue (RBB) colour coding of circuits. Section 24 also allows orange, brown, & yellow (OBY) for isolated systems in patient care areas.

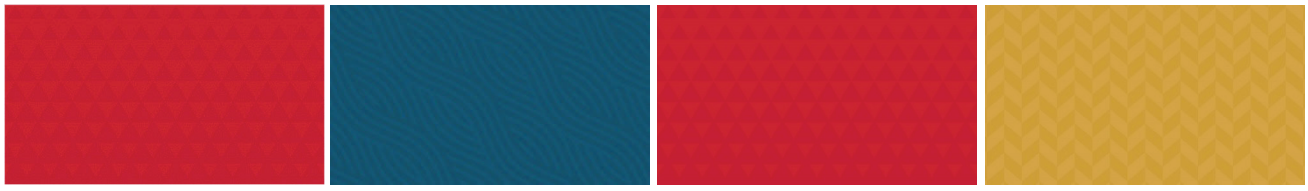
OBY colour coding allows for safer installation when a panelboard cover is removed—the voltage of various wires is very clear. As a result, some have used OBY for the colour coding of 480Y/277V and 600Y/347V (slash voltage) circuits to differentiate them from 208Y/120V circuits in other than isolated systems in patient care areas. Unfortunately, this is not code compliant. A code change request has been sent to CSA to allow this practice.

In the meantime, the following practices are recommended:

- New installations are to use RBB exclusively, even when there are multiple slash voltages being utilized within a building. The installers should adequately identify raceways, junction boxes and panelboards of the voltages that are contained within.
- New circuits that are RBB can enter an existing panelboard that contains OBY circuits.
- Existing OBY circuits that are being reused should continue to be OBY. Please note that an existing 480Y/277V or 600Y/347V lighting panelboard can service more than one floor in a building.
- Always confirm with the AHJ before proceeding with design/construction.

Disclaimer: The information in this bulletin is not intended to provide professional design advice. If professional expertise is required with respect to a specific issue or circumstance, the services of a professional should be sought.

APPENDIX I –DEVELOPMENT SECURITY DEPOSIT POLICY



CONSTRUCTION & INSTALLATION PERMIT

DEVELOPMENT SECURITY DEPOSIT

Date Issued: **May 2023**

Updated:

Airport Authority Contact: **General Manager Development Services**

1. Policy

1.1. A development security deposit may be required by The Calgary Airport Authority (the "Authority") to serve as a financial guarantee for the protection of Authority assets and incentive for proponents to fulfill all of the terms and conditions related to their construction projects.

1.2. The requirement for a development security deposit may be waived in certain instances where other financial security of greater value is in place and is accessible for the purposes as set out in this Policy.

2. Applicability

- New land development;
- Renovation/expansion to existing land assets;
- New air terminal building development;
- Renovation/expansion to existing air terminal building development;
- Any development project at Springbank Airport;
- Projects by others, including service providers, as deemed applicable.

3. Procedures

3.1. Upon notification of a development project, the proponent will be informed that a development security deposit, normally in the form of a letter of credit, may be required before a Construction & Installation Permit (CIP) will be issued.

3.2. The development security deposit applicability and amount will be determined on a project by project basis through consultation with the appropriate Authority sponsor (usually Commercial Properties or Land Development) and the Development Services Coordinator based on the Fee Schedule Guide (see APPENDIX 'A').

3.3. The development security deposit letter of credit is to have an initial expiry date of 90 days after the anticipated construction completion, with an auto-renewal clause.

3.4. If the proponent remits a cash security deposit, the Authority shall pay interest at the end of each calendar year, and/or at the return of the development security deposit, interest on the security deposit calculated on a monthly basis equal to the difference between (i) the prime lending rate and (ii) 2%. Such rate shall be adjusted monthly on the first day of each month during the period that the security deposit is held based on the prime lending rate in effect on the first day of each calendar month.

3.5. The development security deposit must be received by the Authority prior to any CIP related to the project being issued.

3.6. The Authority will retain the development security deposit as restricted cash for the duration of the construction project (including 90 days after notification of completion of construction/occupancy).

3.7. The Authority may draw down upon the development security deposit at any time provided that appropriate notification has been given to the proponent and the response has been deemed insufficient or non-responsive in nature.

3.8. The Authority will return the development security deposit accompanied by a “Letter of Project Closure” to the proponent once all terms and conditions of the CIP have been satisfied. Under normal circumstances, the proponent will have 90 days upon completion of construction/occupancy to fulfill the terms and conditions of the CIP, including submission of as-built drawings. This time period may be extended at the discretion of the Authority.

APPENDIX 'A'
FEE SCHEDULE GUIDE

Project Type	Project Value	Security Type	Security Amount
Land Projects – New Development – Primary Lease Holder (No sub-lease)	No min/max	Letter of Credit Only	Min $5,000 up to 5% of value
Land Projects – Expansion / Renovations – Primary Lease Holder (No sub-lease)	No min/max	Letter of Credit Only	Up to 5% of value
Land Projects – Sub-Lease Holders	No min/max	Not Required*	N/A
Terminal Building Projects – As-builts Required	$5,000 or less	Cash or Letter of Credit	$500 fixed fee
Terminal Building Projects – As-builts Required	Over $5,000	Letter of Credit Only	Min $500 up to 5% of value
Terminal Building Projects – As-builts Not Required	No min/max	Not Required*	N/A
Springbank Airport – Primary Lease Holder	No min/max	Letter of Credit Only	Up to 5% of value
Springbank Airport – Sub-Lease Holders	No min/max	Not Required*	N/A
Other **	No min/max	Letter of Credit	To be determined

*Provided project does not require as-built drawing to be submitted, or does not affect existing main structural, electrical, mechanical and life / safety components of the building or site or modify Airport Authority assets in any way.

** May include projects by other agencies & organizations not covered by a lease / license agreement, on-going work by tenants / contractors / operators, etc.