



**ST. CLAIR CATHOLIC**  
DISTRICT SCHOOL BOARD

*Lighting the Way ~ Rejoicing in Our Journey*

**Addendum # 005**

**TENDER NUMBER: 619-CP2003**

**Renovations and Atrium Project**

**Our Lady of Fatima Catholic School**

**545 Baldoon Road, Chatham, ON**

**Revised Submission Deadline and Location:**

**Thursday May 14, 2020**

**4:00:00 PM Local Time**

**Submission Via Email**

**ISSUED: May 8, 2020**

**ADDENDUM #005**

*This addendum forms part of the Contract Bid Documents and amends the original drawings and specifications issued for Bid on February 19, 2020.*

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**51**

## **PART A – GENERAL**

### **.1 SECTION 2.41 HEALTH & SAFETY**

This section has been revised to add the following:

**COVID-19 SAFETY MEASURES:** Contractors must observe and enforce all safety measures and standardized protocols as they pertain to construction site health and safety during the COVID-19 Pandemic. Prior to the commencement of work contractors are required to submit their Jobsite Measures to Protect Against COVID-19 with their health & safety program. Contractors should note that the following resources are available and should form part of their standards: Government of Ontario: <https://www.ontario.ca/page/construction-site-health-and-safety-during-covid-19>. Canadian Construction Association: <https://www.cca-acc.com/covid-19-resources/>.

### **.2 QUESTIONS AND ANSWERS**

Q1: Request for Alternative: Modified Bituminous Membrane Roofing – IKO

A1: The assembly that is shown on the drawings is the assembly that the Board wishes to have laid down. The specifications are for a Modified Bitumen Roofing assembly. The assembly is built up according to Assembly Type R1 and R2 on drawing A050, and Revised Specification 07 52 00 – Modified Bituminous Membrane Roofing R2 - issued in Addendum #005. IKO products are approved.

Q2: Please confirm what the aluminium finish is to be? The spec calls off clear and bronze finishes.

A2: If this is a question about the aluminum glazing system the answer is all clear anodized.

Q3: Please clarify all aluminum framing is to be Alumicor 2200?

A3: Specifications read that a number of suppliers meet the intent of the specifications. Alumicor is listed.

Q4: Where are windows W12, W13 and W14 on the floor plans?

A4: Please refer to Drawings and Specifications Issued as part of this addendum. They are clearly noted on the elevations and reference clearstorey windows around the atrium. These are exterior aluminum insulating glazed window framing systems.

Q5: Please confirm what type of glass is in each door/frame. The door schedule only notes yes for glass but does not clarify what type of glass.

A5: Please refer to Drawings and Specifications Issued as part of this addendum. This question is addressed.

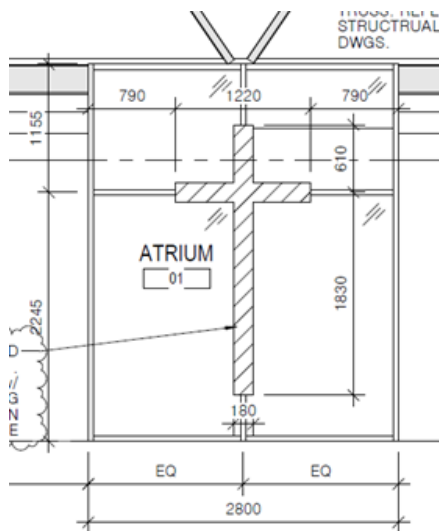
Q6: Please confirm what type of door D133.e is to be? Says type 1 but then says yes to glass?

A6: The door is to be a slab metal door. Painted. No glass. Please refer to Drawings and Specifications Issued as part of this addendum.

Q7: Where are door types D125.k-D125.n on the floor plan? Are two of these the learning commons doors or what are their door numbers?

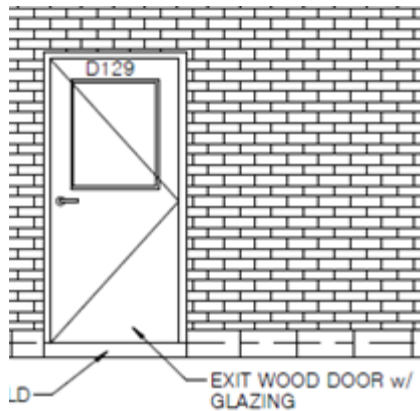
A7: Refer to Addendum # 004, reissued drawing A151. D125 L and 125N remain as all glass doors. Refer to Elevation 4/A1000 and specifications. Doors 125K and 125M are deleted. Please refer to Drawings and Specifications Issued as part of this addendum.

- Q8: D113.1 and D113.2 are called off as hollow metal doors in existing frames on the door schedule but on the floor plan and elevations they are shown in window types W5 and W3 which are aluminum. Please clarify.
- A8: D113.1 and D113.2 are new hollow metal doors in new hollow metal frames. Window types W3, W4 and W5 are all new hollow metal doors and frames. Please refer to Drawings and Specifications Issued as part of this addendum.
- Q9: Please clarify which glass types the glass tags are relating to as there is no legend or corresponding tags in the spec.
- A9: Please refer to Drawings and Specifications Issued as part of this addendum. These clarifications have been addressed.
- Q10: The interior windows call of IGU, please clarify.
- A10: Please refer to Drawings and Specifications Issued as part of this addendum. This clarifications has been addressed.
- Q11: Section 3/A400 calls off a new hollow metal window with glazing that does not correspond with the floor plan. Please clarify.
- A11: Please refer to Drawings and Specifications Issued as part of this addendum. Theses clarifications have been addressed. Note on 3/A400 is correct.
- Q12: Please confirm all film is being supplied by Ultimate Reflections.
- A12: Please refer to Drawings and Specifications Issued as part of this addendum. There are approved alternate films in addition to Ultimate reflections.
- Q13: Is the frame below an aluminum or hollow metal frame? What type of glass? There is no tag on it, please clarify.



- A13: Please refer to Drawings and Specifications Issued as part of this addendum. Clarifications have been addressed.

Q14: The door below (D129) is not on the schedule. Please confirm if it is existing?



A14: The door is an existing Hollow Metal Door and frame is to remain and to be repainted.

Q15: Re: Addendum #4, answer A17. The answer refers to details 4 & 5 on A500 for the missing millwork information. Can it be re-referenced where to find the millwork details as these are wall sections?

A15: Apologies – There is millwork shown on the plan and it is in contract. The reference should be to details 4 & 5 on A900.

Q16: Please specify a manufacturer for the footrail bracket shown on 3/A901 & 5/A901

A16: Stainless Steel 304 - Product # 4002170 Footrest with compatible 2" dia. Rail, end caps and fitments to suit the installation. As supplied by Richelieu – Available at Dayvan – Toronto or Nystrom Group – Kitchener, Ontario.

Q17: One of my electrical contractors asked if there will be any electrical specifications issued for this project?

A17: Please read Addendum #1 Issued February 24<sup>th</sup>.

Q18: Request for approved alternate – Aluminium Soffit Panels: Dical aluminium siding details attached.

A18: Dical P-4 Plank is approved as an equal for this application. Colour to be selected by architect if carried in bid.

Q19: Request for approved alternate – Preformed Metal Siding: AL13 Architectural Systems

A19: AL 13 Architectural Systems 4P plank system is approved as an equal for this application. Colour to be selected by architect if carried in

Q20: In the roof description it states a 2-ply Modified Bitumen roofing system, in the specification a sopra smartboard 180, base 180 and cap 250 are specified which could be considered a 3-ply modified bitumen roofing system. Please confirm a smartboard, base and cap roof composition

A20: The assembly that is shown on the drawings is the assembly that the Board wishes to have laid down. The specifications are for a Modified Bitumen Roofing assembly. The assembly is built up according to Assembly Type R1 and R2 on drawing A050, and Revised Specification 07 52 00 – Modified Bituminous Membrane Roofing R2 – re- issued in this Addendum #005.

- Q21: Interior glazing is called out as IGU-1 which has low-e, argon and warm edge spacer. There is minimal benefit to having this on the interior. Can interior glazing be switched to just clear on clear in the interest of cost savings?
- A21: Please refer to Drawings and Specifications Issued as part of this addendum. This clarifications has been addressed.
- Q22: Can we please get frame dimensions for W1, W6, W7, and W14?
- A22: Please refer to Drawings and Specifications Issued as part of this addendum. This clarifications has been addressed.
- Q23: What back section size is required for the curtainwall?
- A23: Please refer to Drawings and Specifications Issued as part of this addendum. This clarifications has been addressed.
- Q24: Request for Tarkett Multiflex (Gerflor Taraflex) as an equal.
- A24: Gerflor Taraflex Sport M Plus (7.0 mm) Drytex is approved as an equal.

#### **PART B – SPECIFICATIONS**

- |   |            |
|---|------------|
| 1. Section 00 73 19 – Health and Safety – Covid 19 – Add to documents                         | 5 Page(s)  |
| 2. Revised Specification Section 07 52 00 to replace previously issued. Revisions throughout. | 12 Page(s) |
| 3. Revised Specification Section 08 11 00 to replace previously issued. Revisions throughout. | 13 Page(s) |
| 4. Revised Specification Section 08 80 00 to replace previously issued. Revisions throughout. | 8 Page(s)  |

#### **PART C – ARCHITECTURAL DRAWINGS**

Refer to attached Drawings re-issued as part of Addendum No. 2 issued by Wilson Diaz Architects Inc.

6 Sheets(s)

#### **PART D – STRUCTURAL DRAWINGS/SKETCHES**

1. Reserved.

#### **PART E – MECHANICAL / ELECTRICAL DRAWINGS**

1. Reserved

#### **PART F – CIVIL AND SITE WORK DRAWINGS**

1. Reserved

**This concludes Addendum #005.**

## Part 1 General

### 1.1. REFERENCES

- .1 The requirements of this section forms and integral part of each division specified within the specification documents including drawings and all subsequent addenda.
- .2 The Constructor is entirely responsible for all Health and Safety requirements in effect at the time of this RFT and all subsequent directives and orders.
- .3 The constructor is responsible to make all parties to this work aware of the requirements of this section and related supplementary requirements.
- .4 Refer to and comply with Bid Documents: RFT Process, Terms and Conditions.
- .5 Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .6 Canadian Standards Association (CSA)
  - .1 CSA S350-M1980, Code of Practice for Safety in Demolition of Structures Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990.
- .7 The Occupational Health and Safety Act (Ont. Reg. 213/91 or latest edition), the Ontario Construction Safety Act, the regulations of the Ontario Ministry of Labour and Ontario Hydro Safety Requirements shall be strictly enforced.

### 1.2. INTENT AND OBLIGATION

- .1 The Constructor provide (unless notified otherwise, by the Owner's Representative) each item mentioned or indicated; perform each operation prescribed; and provide therefore all labour, materials, equipment and services necessary to complete the work to the satisfaction of the Owner's Representative.
- .2 Each Subcontractor for the trades, Supplier and any individual that is attendant to the site by the Constructor shall be held responsible to the General Contractor to create and maintain a safe work place, as well as, providing requested documentation for all scope of work bearing upon their trade, inclusive of whatever miscellaneous materials and/or safety equipment is required to provide and protect their scope of work and that of other providers of scope of work.
- .3 CONSTRUCTION SAFETY MEASURES  
Observe, comply with and enforce:
  - .1 Construction safety measures required by the National Building Code (1990) Part 8; the Provincial Government; Workers' Compensation Board.
  - .2 Municipality requirements and by-laws, including notices, directives and orders of Municipal and Regional Health authorities.
  - .3 The Occupational Health and Safety Act (Ont. Reg. 213/91 or latest edition),
  - .4 The Ontario Construction Safety Act, the regulations of the Ontario Ministry of Labour
  - .5 Ontario Hydro Safety Requirements.

- .6 In particular, Health and Safety/Ministry of Labour-Labour.gov.on.ca: **Construction site health and safety during Covid-19.**  
<https://www.ontario.ca/page/construction-site-health-and-safety-during-covid-19>
- .7 The Constructor shall ensure that copies of all applicable construction safety regulations, codes and standards are available on the job-site throughout the period of construction. All workers including the Consultants and the Owner are to be informed that these documents are available for reference at any time including **COVID-19 - Standardized Protocols for All Canadian Construction Sites latest version to be part of these standards.** <https://www.cca-acc.com>
- .8 The Constructor shall ensure that all supervisory personnel on the job-site are fully aware of the contents of the Occupational Health and Safety Act (Ontario Regulation 213/91 - Construction Projects), as amended, and the Workers' Compensation Act and, that they comply with all requirements and procedures prescribed therein. These documents include, but are not limited to, the following construction safety requirements:
- .1 General Contractor to register with the Director of the Occupational Health and Safety Division before or within thirty (30) days of the commencement of the project, (Ont. Reg. 213/91, Sec.5).
  - .2 File a notice of project with a Director indicating the date of commencement of the project, (Ont. Reg. 213/91, Sec. 6).
  - .3 Notification prior to trenching deeper than 1.2m, (Ont. Reg.213/91, Sec.7).
  - .4 Accident Notices and Reports, (Ont. Reg. 213/91, Sec. 8 through Sec.12).
  - .5 General Safety Requirements, (Ont. Reg. 213/91, Sec. 13 through Sec.19).
  - .6 General Construction Requirements, eg., protective clothing, hygiene practices, housekeeping, temporary heat, fire safety, access to the job site, machine and equipment guarding and coverings, scaffolds and platforms, electrical hazards, roofing, mental, (Ont. Reg. 213/91, Sec. 20 through Sec. 221).
  - .7 Establish a Joint Health and Safety Committee where more than 19 workers are employed for more than three (3) months, (RSO, S.8).
  - .8 Establish a Worker Trades Committee for all projects employing more than 49 workers for more than three (3) months, (RSO, S. 8a and 8b).
  - .9 Ensure that all activities arising out of (.7) and (.8) above are recorded and that minutes are available to an inspector of the Ontario Ministry of Labour and the Owner's Representative.
  - .10 Prior to commencement of work the Constructor shall Submit a Health & Safety program developed by the Constructor including Jobsite Measures to Protect against COVID-19.
  - .12 The Constructor shall convene a meeting to include the owner and consultants and major sub trades to review in detail the **Jobsite Measures to Protect against COVID-19.**



- .13 The Constructor shall then convene a meeting to include each Subcontractor for the trades, Supplier and any individual that may be attendant to the site by the Constructor to review in detail the **Jobsite Measures to Protect against COVID-19.**
- .14 **All meetings shall comply with Covid 19 Distancing Requirements current at the time of the meeting. Meetings can be by Audio/Video link arranged in advance and through notification by the Constructor.**
- .15 All attendees are to confirm attendance by signature or via email in the event of a distance video meeting.
- .16 In the event of a conflict between any of the provisions of the above authorities the most stringent provisions are to be applied.

## 1.2. SUBMITTALS

- .1 Submit Site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1 Site-specific safety hazard assessment.
  - .2 Safety and health risk or hazard analysis for site tasks and operation.
- .2 Submit Construction Safety Checklists after completion.
- .3 Submit copies of reports or directions issued by Federal and Provincial health and safety inspector.
- .4 Submit copies of incident and accident reports.
- .5 Submit to Consultant with Material Safety Data Sheets (MSDS) in accordance with each section and division of work specified.
- .6 Personnel training requirements including as follows:
  - .1 Names of personnel and alternates responsible for site safety and health, hazards present on site, and use of personal protective equipment.
- .7 Consultant will review Contractor's site-specific Health and Safety Plan and provide comments. Revise plan as appropriate and resubmit plan to Consultant.
- .8 On-site Contingency and Emergency Response Plan: Address standard operating procedures to be implemented during emergency situations.

## 1.3. FILING FOR NOTICE OF PROJECT

- .1 Apply for Ministry of Labour – Notice of Project.

## 1.4. WORK PERMIT

- .1 Assume Building Permit related to project prior to commencement of Work. Owner will pay for costs associated with the application of the Building Permit.

**1.5. SAFETY ASSESSMENT**

- .1 Perform site-specific safety hazard assessment related to project.

**1.6. MEETINGS**

- .1 Pre-construction Meetings: Attend health and safety pre-construction meeting.

**1.7. REGULATORY REQUIREMENTS**

- .1 Comply with specified standards and regulations to ensure safe operations at site containing hazardous or toxic materials.

**1.8. GENERAL REQUIREMENTS**

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Relief from or substitution for any portion or provision of minimum Health and Safety Guidelines specified herein or reviewed site-specific Health and Safety Plan must be submitted to Consultant in writing. Consultant will respond in writing, either accepting or requesting improvements.

**1.9. RESPONSIBILITY**

- .1 Be responsible for safety of persons and property on site and for protection of persons off site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

**1.10. COMMUNICATION REQUIREMENTS**

- .1 Comply with Ontario Health and Safety Act.
- .2 Provide Consultant with Material Safety Data Sheets (MSDS).

**1.11. UNFORESEEN HAZARDS**

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Consultant verbally and in writing.
- .2

#### **1.12. POSTED DOCUMENTS**

- .1 Provide documents as follows and post on site:
  - .1 Safety Policy
  - .2 Health and Safety Representative
  - .3 General Requirements – Constructor’s name
  - .4 Worker’s Compensation Board Form 82
  - .5 Worker’s Compensation Board Regulation 1101
  - .6 Ministry of Labour Orders
  - .7 Occupational Health and Safety Act
  - .8 Material Safety Data Sheets
  - .9 Floor Plan
  - .10 Notice of Project
  - .11 Joint Health and Safety Committee Members
- .2 Comply with provincial general posting requirements.

#### **1.13. CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by Consultant or Authorities Having Jurisdiction.
- .2 Provide Consultant with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Consultant may stop Work if non-compliance of health and safety regulations is not corrected.

#### **1.14. BLASTING**

- .1 Blasting or other use of explosives is not permitted.

#### **1.15. POWDER ACTUATED DEVICES**

- .1 Use of powder actuated devices is not permitted.

#### **1.16. WORK STOPPAGE**

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
- .2 Assign responsibility and obligation to Health and Safety Officer to stop or start Work when, at Health and Safety Officer’s discretion, it is necessary or advisable for reasons of health or safety. Consultant may also stop Work for health and safety considerations.

**END OF SECTION**

## PART 1 - GENERAL

### 1.01 DESCRIPTION

#### .1 General Requirements

.1 Division 1 and General Requirements, is a part of this Section and shall apply as if repeated here.

#### .2 Work Performed by Other Sections Related to this Section is specified in

.1 Section 02 41 00 – Selective Demolition

.2 Section 06 10 00 – Rough Carpentry

.3 Section 07 62 00 - Flashing and Sheet Metal

.4 Section 07 72 33 - Roof Hatches

.5 Section 07 92 13 - Joint Sealants

.6 Mechanical Divisions - Roof Drains

.7 Mechanical Divisions - Vent Stack Covers and Flashing

#### .3 This Section shall include performance of Work which is specified in

Section 07 62 00 - For field quality control of flashing installation contiguous with the work of this Section.

#### .4 Work Performed by this Section to Meet Requirements of the Following

Section 07 26 00 – Vapour and Air Barrier

#### .5 Scope of Work

.1 To remove the existing roof membrane, insulation, metal flashing, wood cants, and materials down to existing roof deck on existing school.

.2 Preparation of new and existing decks to receive new roofing.

.3 Install a new 2-ply modified bitumen membrane roof to the new addition and existing roof areas, refer to roof drawings. Ensure proper tie in to existing roofing systems.

### 1.02 QUALITY ASSURANCE

#### .1 Subcontractors Qualifications

.1 Execute Work of this Section only by a Subcontractor approved by the membrane manufacturer and who has adequate plant, equipment and skilled tradesmen to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past five years.

.2 Install membrane approved by the personnel who have been trained and who are approved by the membrane manufacturer.

.3 Ensure that the roofing Subcontractor's suppliers and subcontractors have the same qualifications.

**.2 Requirements of Regulatory Agencies**

- .1 Ensure that materials, including adhesives, and roof anchorage meet requirements of jurisdictional authorities.
- .2 Ensure that roofing materials, including adhesives and roof anchorage, are listed by Factory Mutual as approved roofing components; and that details of roofing anchorage conforms to Factory Mutual requirements.

**.3 Source Quality Control**

- .1 Review Drawings and inform Architect of conditions which will not ensure a satisfactory installation.
- .2 Arrange for a site meeting for review of installation procedures with a representative of membrane manufacturer.

**.4 Compatibility**

- .1 Assure that all roofing components are compatible with each other.
- .2 Ensure that all roofing components are compatible with other systems to which attachment or other physical interface is required.

**1.03 REFERENCE STANDARDS**

- .1 ASTM International
  - .1 ASTM A653/A653M-18, Specification for Steel Sheet, Zinc Coated (Galvanized) by Hot Dip Process
  - .2 ASTM D3686-13 Standard Practice for Sampling Atmospheres to Collect Organic Compound Vapours (Activated Charcoal Tube Absorption Method)
- .2 Canadian General Standards Board
  - .1 CGSB Specification 51-GP-20M, Thermal Insulation, Expanded Polystyrene.
  - .2 CGSB Specification 37-GP-56M, Membrane, Modified, Bituminous, Prefabricated and Reinforced for Roofing
- .3 Canadian Standards Group
  - .1 CSA Standard A82.27-M1977, Gypsum Board Products
  - .2 CSA Standard A123.4-04(R2018), Asphalt for Constructing Built Up Roofing Coverings and Waterproof Systems

**1.04 SUBMITTALS**

**.1 Inspection Company Reports**

- .1 Submit roof inspection reports as the Work progresses.
- .2 Upon completion of roofing Work, submit duplicate certificates of acceptance issued by the roofing inspection company.

**.2 Shop Drawings**

- .1 Submit shop drawings for approval of system and as required for composite membrane.

**.3 Samples**

- .1 Submit samples and manufacturer's literature before ordering materials and proceeding with the Work.

**1.05 DELIVERY STORAGE AND HANDLING**

- .1 Store materials in dry protected area as recommended by manufacturer to ensure that they are not damaged.
- .2 Do not store roofing materials on roof. Store them under cover while roofing Work is not in progress.
- .3 Package roofing materials and identify on attached labels the manufacturer, brand, contents, weight as applicable, and product and specification numbers.
- .4 Store materials in dry protected areas between temperatures of 15°C (60°F) and 27°C (80°F), except for membrane. If materials are exposed to lower temperatures, restore them to specified range prior to use.

**1.06 SITE CONDITIONS**

- .1 Environmental Requirements
  - .1 Do not apply any part of the roofing system over damp materials, nor during a period of damp weather, rain, snow, or otherwise inclement conditions.
  - .2 Apply membrane and components only when air and surface temperatures are within limits recommended by manufacturer and not less than 5°C (40°F).

**1.07 WARRANTY**

**.1 Extended Warranty**

- .1 Warranty contained in GC24 is, with respect to Section 07 52 00, extended from 1 year to 10 years. Without restricting generality of warranty, defects shall include leaking, failure to stay in place, undue expansion, lifting, deformation, loosening, failure to adhere, splitting of same, deterioration, blisters, etc.
- .2 Membrane manufacturer will issue a written document in the Owner's name, valid for 15 years, stating that they will repair any leaks in the roofing membrane to restore the roofing system to a dry and watertight condition, to the extent that membrane manufacturing or installation defects caused water infiltration. The warranty must cover entire cost of repairs including labour and materials, for the full duration of the warranty period.
- .3 Contractor will issue a written and signed document in the Owner's name, certifying that the work executed will remain in place and free of any workmanship defect for a period of 10 years, starting from the date of acceptance.
- .4 Contractor shall arrange with Architect and/or Owner, about 1 month before warranty expires, to visit site, examine roofing installation specified in this Section, and make necessary arrangement through no fault or neglect of Owner or Architect, then period of warranty shall extend to one month after such arrangement is made.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

Basis of specification is Soprema, equivalent products as supplied by Henry Company or IKO for torching application of the base sheet and torching of the cap sheet, will be accepted upon review and approval by consultants. The colour of the granular surface on the flashing membrane is to be selected by the Owner. Supply additional granules to be applied to bitumen outflows between membrane sheets. Use only compatible materials in roofing system.

- .1 **Sheathing Board** – Silicone treated fibreglass-mat faced gypsum roof board to ASTM C1177/C1177M-04, 12.7 mm thick, 1219mm wide boards x 2438 mm long min. Ends cut square; DensDeck Prime as manufactured by Georgia-Pacific, or approved alternate.
- .2 **Gypsum Board Tape** – Sopraguard Tape as manufactured by Soprema, "V-8086" Contractor's sheathing tape as manufactured by 3M Canada, "Tuck 20502" Contractor's Sheathing tape as manufactured by Canadian Technical Tape Ltd. Modiflex Tape as manufactured by IKO, or approved alternate.
- .3 **Base Sheet Panel** – Soprasmart board 180, IKO Protectobase 180, or approved equal - high-performance high-density support panel composed of SBS modified bitumen membrane with a non-woven polyester reinforcement, factory-laminated on asphaltic board (SOPRABOARD). The surface is covered with a minimum 4mm thermo-fusible plastic film.
- .4 **Primer (for heat welded of asphalt adhered membranes)** – A blend of elastomeric bitumen, volatile solvents and adhesive enhancing additives used to prime, concrete, metal or gypsum board substrates prior to the application of torch applied or asphalt adhered membranes; Elastocol 500 by Soprema, Mod-bit Primer as manufactured by IKO, or approved alternate.
- .5 **Primer (for self-adhesive membranes)** – Composed of SBS synthetic rubber, volatile solvents, adhesive enhancing resins used to prime porous and nonporous substrates such as wood, concrete, metal or gypsum board to enhance the adhesion of self-adhered membranes at temperatures above -10°C; Elastocol Stick by Soprema, S.A.M Adhesive as manufactured by IKO, or approved alternate.
- .6 **Duotack** – LOW-RISE two-part urethane adhesive to be used for the application of rigid insulation. Sopravap'r 40 By Soprema, Millennium by IKO.
- .7 **Roofing Asphalt** - Type 2 oxidized asphalt with a softening point between 75°C - 83°C conforming to CSA A123.4M.
- .8 **Vapour Retarder (Steel deck areas)** – Self-adhesive air/vapour barrier membrane composed of bitumen modified with thermoplastic polymers and high density polyethylene film; Sopravap'r 40 by Soprema, MVP by IKO, or approved alternate.
- .9 **Mechanical Fasteners** - Screw fasteners with 3" round galvanized metal stress plates, self-tapping corrosion resistant screw, length as required to ensure minimum 19 mm penetration into deck; Dekfast #14 screws complete with 3" round Galvalume steel insulation plates as manufactured by SFS Intec Inc. or approved alternate.
- .10 **Membranes** -
  - .1 Membrane Base Sheet: A membrane sheet, composed of Styrene Butadiene Styrene (SBS) modified bitumen and reinforced with non-woven polyester mat, weight 180 g/m<sup>2</sup>, thickness of 2.2 mm., with a thermofusible poly film top surface and a lightly sanded underside to meet CGSB 37-GP-56M, Type 2, Class C, Grade 2 for base sheets; Sopralene 180 PS, by Soprema, MP-180-FS-Base by IKO, or other approved manufacturer.

- .2 Self-Adhesive Membrane: A membrane sheet, composed of Styrene Butadiene Styrene (SBS) modified bitumen and reinforced with non-woven polyester mat, weight 180 g/m<sup>2</sup>, thickness of 2.2 mm., with a poly upper surface to torch cap sheets and a self-adhered lower surface to meet CGSB 37-GP-56M Type 2 Class C, Grade 2. NP180 Tack Sheet by Henry, Armourbond 180 by IKO, or other approved manufacturer.
- .3 Base Sheet Flashings: A membrane sheet, composed of Styrene Butadiene Styrene (SBS) modified bitumen and reinforced with a heavy duty glass mat, weight 130 g/m<sup>2</sup>, thickness of 2.5 mm., with a thermofusible poly film top surface and a self adhesive underside protected by a silicone release film, to meet CGSB 37-GP-56M, Type 2, Class C, Grade A for base sheets; Sopraflash Flam Stick as supplied by Soprema, Armourbond Flash by IKO, or other approved manufacturer.
- .4 Membrane Cap Sheet and Flashing Cap Sheet: A membrane sheet in the field of the roof, composed of Styrene Butadiene Styrene (SBS) modified bitumen and reinforced with a non-woven polyester mat, weight 250 g/m<sup>2</sup>, 3.5 mm thickness, with ceramic mineral granules embedded into top surface and a thermofusible poly film on the underside, meeting CGSB 37-GP-56M Type 1, Class A, Grade 2, for cap sheets; Sopralene Flam 250 GR supplied by Soprema, Prevent TP-250-Cap as supplied by IKO Roofing Products, Bakor or other approved manufacturer.
- .5 Base Sheet Perimeter Membrane: A membrane sheet, composed of Styrene Butadiene Styrene (SBS) modified bitumen and reinforced with a heavy duty combination of non-woven polyester with glass grid composite, weight 170 g/m<sup>2</sup>, thickness of 2.2 mm., with a lightly sanded top and bottom surface and a 200mm wide selvedge on both sides of the roll, to meet CGSB 37-GP-56M, Type 2, Class C, Grade 2 for base sheets; Perimeter by Soprema, or as supplied by IKO Roofing Products, Bakor, or other approved manufacturer.
- .6 Cap Sheet Starter - A membrane sheet, composed of Styrene Butadiene Styrene (SBS) modified bitumen and reinforced with a non-woven polyester mat, weight 250 g/m<sup>2</sup>, 4 mm thickness, with ceramic mineral granules embedded into top surface and a thermofusible poly film on the underside, meeting CGSB 37-GP-56M Type 1, Class A, Grade 2, for cap sheets; Starter Flam GR supplied by Soprema, or as supplied by IKO Roofing Products, Bakor or other approved manufacturer.
- .11 **Waterproofing Mastic** – Composed of synthetic rubbers, plasticized with bitumen and solvents; Sopramastic by Soprema, Aquabarrier Mastic as supplied by IKO, or approved alternate.
- .12 **Asphalt Kettles** - to have thermometer accurately measuring the temperature of the asphalt in the kettle.
- .13 **Caulking** - CGE Silpruf or DOW 790 Low Modulus Silicone Sealant by Soprema or IKO, or approved alternate.
- .14 **Vent Stack Covers** - Lexsucu insulated, tamper proof; Thaler Model # SJ-37, or approved alternate.
- .15 **Roof Drain** – Roof Drain shall be Thaler Roof Specialties Products Inc. Model No. RD-4-RR or approved alternate with FURCO FOR DIRECT CONNECT. Outlet size shall be verified on site by the Roofing Contractor.



- .16 **Rigid Insulation** – Insulation shall be roof insulation which is rigid closed cell, Polyiso Foam Insulation, integrally laminated to fiber-reinforced paper facers, thermal resistance of insulation shall be R-23.6 (L.T.T.R.) (4.0 inch) for the main roof area and R-11.4 (L.T.T.R.) (2.0 inch) around recessed roof drains, Resistance R-Value in accordance with ASTM C1289-11A. All insulation boards shall be 4 feet by 4 feet in size.
- .17 **Tapered Insulation (Recessed Roof Drains)** – tapered insulation shall be faced Isocyanurate Boards conforming to CAN/CGSB-51.26-M86, meeting the requirements of ULC S126 Polyisocyanurate foam panels chemically bonded during the foaming process to facers on the top and bottom organic surfaces. Tapered panels shall not be less than 13m at any point of the roof to the slope indicated on the Roof Plan and Details.
- .18 **Elastomeric Modified Bitumen Adhesive** – COLPLY EF or Cold Gold Field Adhesive By IKO, or approved equal, low volatile organic compound (VOC), low odour, 100% solids and solvent-free polyether-based adhesive.
- .19 **Sealants** – Sealants for metal flashing shall be one-part silicone to conform to CGSB 19 GP 96. Sealants shall be manufactured by Canadian General Electric, Dow Corning or approved equal. The colour of the sealant shall be identical to the colour of the metal flashing; the Owner is to approve the colour before ordering the sealant. This sealant shall be applied to all metal flashing joints including the reglet.
- .20 **Roofing Gravel** – 1/4" to 5/8" size; water washed pea gravel, well graded, opaque, non-porous material free of fines, moisture, ice, and snow or long splinters and conforms to ASTM D1863-086.
- .21 **Precast Pads** – Precast concrete pads shall be 24 inches by 24 inches by 2-inch-thick for additional walkway, etc. as shown on Roof Plan. Pads shall be placed on a 20 inch by 20 inches by 1-inch-thick sections of rigid Type 4 extruded polystyrene insulation.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- .1 Before proceeding with roofing application, ensure that:
  - .1 All existing roof membrane, insulation, metal flashing and cants have been removed from the designated roof area to receive new roofing systems.
  - .2 Existing roof deck is sound; in true planes; and level, or sloped to drains, whichever is design intent.
  - .3 New roof deck is constructed smoothly; in true planes, and level, or sloped to drains, whichever is design intent.
  - .4 Edges of all panels of metal roof deck are supported to prevent deflection.
  - .5 Roof drains have been set and anchored by others at a level to drain and are connected to drainage system.
  - .6 Roof decks are clean and sufficiently dry for application under specified warranty.
  - .7 Adjacent construction and installation of other work incorporated with roof is completed.
  - .8 Roofing surfaces are free of cracks that are wider than bridging ability of roofing materials.
  - .9 Preparations have been made for bases on which equipment will be installed.

- .10 Work that penetrates roof has been installed.
- .2 Defective roofing Work resulting from application to unsatisfactory previously completed Work will be considered the responsibility of those performing the Work of this Section.

### **3.02 PREPARATION**

- .1 Sweep roof deck completely free of dust, dirt and debris.
- .2 Protection
  - .1 Ensure that stored porous materials absorb no moisture. Remove wet materials from Project site.
  - .2 When using adhesives and sealants containing petroleum distillates keep them away from open flames and do not breathe their fumes.
  - .3 Protect membrane from punctures by sharp materials on both their top and bottom sides.
  - .4 Protect surrounding work, and adjacent building and other property from damage during roofing operations.
  - .5 This Section shall make payment for repair of damage caused by its Work.
  - .6 Install temporary blocking and otherwise protect drains during roofing operations, and remove at completion of roofing Work.
  - .7 Protect insulation from sunlight at all times while in storage.

### **3.03 INSTALLATION**

- .1 **General**
  - .1 Apply roofing in accordance with Drawings, Specifications, requirements of jurisdictional authorities, and material manufacturer's printed directions which shall establish minimum requirements not otherwise specified.
  - .2 The installation of sheathing board is to be loose laid and on top of flutes of metal deck and mechanically fastened.
  - .3 Roofing system to be installed to meet requirements of Factory Mutual 1-90.
  - .4 Apply roofing as soon as possible after new roof has been installed.
  - .5 Make adjustments to specified roofing procedures caused by weather and site conditions only when approved.
  - .6 Maintain equipment in good working order to ensure control of roofing operations and protection of Work. Use only roofing equipment recommended and approved by membrane manufacturer.

### **3.04 VAPOUR RETARDER (Self-adhesive)**

- .1 Ensure substrate is suitable prior to installation of vapour retarder. The vapour retarder adhesion is based upon the written recommendations of the membrane manufacturer for the substrate type.
- .2 Beginning at the bottom of the slope, without adhering the membrane, unroll onto the substrate for alignment. Do not immediately remove the silicone release sheet.

3. Align the roll parallel to the corrugations of the steel deck. Make sure the membrane overlaps are supported along their entire length. Place a thin sheet of metal spanning the flutes of the deck under any end laps of membrane as support for the lap.
4. Peel back approx. 12" at one end of the silicone release sheet and adhere this part of the membrane to the deck. Peel back the remaining release sheet at a 45° angle to avoid wrinkles in the membrane.
5. If the membrane is not properly aligned, do not try to adjust it. Instead, cut the roll and start again, making sure that it is properly aligned and that it overlaps the end of the misaligned piece by 150mm.
6. Overlap adjacent membranes by 75mm (3"). Overlap end laps by 150mm (6"). Stagger end laps by at least 300mm (12").
7. The vapour retarder is to be carried up the vertical surfaces a minimum of 8 inches above roof deck.

### 3.05 VAPOUR RETARDER (Mopped)

- .1 Ensure substrate is suitable prior to installation of vapour retarder.
- .2 Apply a coat of asphalt primer to substrate at a rate of 0.15 to 0.25 L/m<sup>2</sup>. All surfaces to be primed must be free of rust, dirt, or any residue that may hinder adhesion. Cover primed surfaces with roofing membrane as soon as possible. Allow primer to flash and dry sufficiently before application of membrane.
- .3 Unroll vapour retarder membrane dry onto substrate for alignment purposes. Overlap side laps by 75 mm and end laps by 150 mm. Laps shall be staggered a minimum of 300 mm. Begin work at bottom of slopes.
- .4 Unroll vapour retarder into layer of hot asphalt spread at a rate of 1 kg/m<sup>2</sup> to 1.5 kg/m<sup>2</sup>.
- .5 Apply asphalt on roof at a temperature of about 230°C and heat in kettle to approximately 250°C taking care to never exceed the asphalt flash point temperature. Follow supplier's recommendations. In colder temperatures (below 10°C), warm membranes underside by sweeping a torch over rolls entire width.
- .6 The roof vapour retarder must meet and overlap the air/vapour barrier on adjoining walls to ensure total air/vapour seal. Incorporate heat-resistant air/vapour barrier continuity strip at these overlaps.
- .7 Install vapour retarder membrane at insulation perimeters and around each element piercing the insulation to ensure sealed connections with base sheet at upstands.
- .8 The vapour retarder is to be carried up the vertical surfaces a minimum of 8 inches above roof deck.

### 3.06 RIGID INSULATION BOARDS

- .1 Install boards with Duotack Adhesive to the vapour retarder. On all insulation surfaces intended for board coverage apply beads of 20mm (3/4") wide on 200mm (8") centers.
- .2 Firmly set the rigid insulation boards in staggered fashion. All boards must be butted tightly together.
- .3 Apply only as many boards as can be covered in the same day.

### 3.07 BASE SHEET PANEL (Soprasmart Board)

- .1 Install with Duotack Adhesive to the rigid insulation as indicated. On all insulation surfaces intended for board coverage, apply continuous strips of 13 to 19 mm (1/2 to 3/4 inch) on 150 mm (6") centres for eight (8) feet around roof perimeter and 200 mm (8") centres for the

field of the roof.

- .2 Firmly set into the strips of Duotack Adhesive. All boards must be evenly and tightly butted together in soldier fashion.
- .3 Apply only as many boards as can be covered in the same day.
- .4 Install Sopralap cover strips across the end laps on the panels by heat-welded with a propane torch.

### 3.08 ADDITIONAL PLYWOOD AND/OR WOOD BLOCKING

- .1 Install all new wood blocking and plywood as detailed on the applicable Details.

Note: The new plywood detailed on the inside face of parapet wall is not to be installed until the first ply of base sheet roof membrane is applied 3 inches up the vertical surface of parapet wall.

### 3.09 PRIMER

- .1 Apply primer to the wood blocking and plywood surfaces which will be in contact with the self - adhesive membranes at a rate of 0.2 to 0.3 l/m<sup>2</sup>. All surfaces to be primed must be free of rust, dust or any residue that may hinder adherence. Cover primed surfaces with roofing membrane as directed by the Manufacturer.

### 3.10 ROOF MEMBRANE

- .1 Provide a 2-ply modified bitumen membrane (torch cap) over the overlay board.

#### .2 Base Sheet:

- .1 Unroll base sheet dry onto substrate with first side lap lined up with centre of drain and parallel to edge of roof. Allow membrane to relax for 15 minutes prior to application. In cold weather (below 10°C) burn the plastic film on the top surface in zag-zag pattern with a propane torch to hasten relaxation.
- .2 Overlap side laps by 75 mm, along lines provided for this purpose, and overlap end laps by 150 mm. Stagger end laps by at least 300mm.
- .3 Re-roll base sheet and unroll again onto a bed of hot asphalt. Apply asphalt to one half of side only and seal the remaining outside half with a torch. Burn off the poly film at all end laps before adhering with asphalt.
- .4 Pour hot asphalt in front of each roll at a temperature of about 230°C and heat in kettle to approx. 250°C taking care not to exceed the flash point of the asphalt. Minimum temperature at point of contact should be 220°C to 230°C. Ensure hot asphalt in kettle is in constant use to avoid distillation.
- .5 Do not spread asphalt more than 3 metres in front of each roll. In colder weather (below 15°C) do not spread asphalt more than 1 metre in front of each roll.
- .6 Below 10°C heat the membrane underside by sweeping a torch over entire roll's width. Be careful not to direct flame toward the bitumen.
- .7 Hot asphalt must never be applied on vertical surfaces at levels higher than 25mm above horizontal base sheet roofing surface.
- .8 Avoid forming wrinkles, air pockets or fishmouths.
- .9 Install reinforcements at penetrations (drains, stack flashings, cone flashings) at 45° degree angle to the field membrane rolls and in accordance with manufacturer's recommendations.
- .10 Always seal overlaps at the end of the workday with propane torch and hot trowel.

#### .3 Base Sheet Flashing

- .1 Before applying primer or membranes, always remove the plastic film on the section of field membrane to be covered by overlaps.
  - .2 Apply a coating of primer to parapet, curb, upstand substrates including overlaps and allow to flash-off and dry.
  - .3 Pre-cut one (1) metre wide pieces of sufficient length to completely cover the parapet, curb, upstand detail complete with a minimum 100mm (4") overlap to the field membrane.
  - .4 Position pre-cut membrane piece. Peel back 100 to 150mm (4" to 6") of the silicone release paper and adhere this part of the membrane at the top of the parapet, curb or upstand. Gradually peel back the remaining silicone release paper, pressing down on the membrane with an aluminium applicator to ensure good adhesion. Use the applicator to ensure a perfect transition between the upstand and the field surface. Smooth the entire membrane surface with a roller for full adhesion. Fasten outside edge of membrane at face of parapet at 300mm (12") O.C. with round-top roofing nails.
  - .5 Overlap side laps 75mm (3") and stagger by at least 300mm (12") from base sheet side laps to prevent excessive layering.
  - .6 Cut off corners at end laps to be covered by the next roll.
  - .7 Install a reinforcing gusset at all inside and outside corners.
  - .8 Always seal overlaps at the end of the workday with propane torch and hot trowel.
- .4 Cap Sheet:
- .1 Prior to installing the cap sheet membrane, all insulated flanges are to be installed around each roof penetration and secured through the metal deck layer with four (4) fasteners per flange before applying base target section on top.
  - .2 Once base sheet is applied, the stripping has been completed and no defects are apparent, proceed with cap sheet installation.
  - .3 Begin application of the cap sheet at the lowest edge. Cap sheet shall be unrolled with care taken to ensure proper alignment of the first roll.
  - .4 Weld cap sheet onto base sheet with torch recommended by membrane manufacturer. During application, simultaneously melt both designated contact surfaces so a bead of bitumen is apparent as cap sheet unrolls.
  - .5 Avoid overheating.
  - .6 Unless overlap widths differ between cap and base sheets, make sure joints between the two layers are staggered by at least 300 mm.
  - .7 Overlap cap sheet side laps by 100mm (4") and end laps by 150 mm. Cut off corners at end laps to be covered by next roll. All overlap surfaces must be granule-free or degranulated.
  - .8 Care is to be taken to ensure heating is consistent across the width in order to avoid skips or voids. Bitumen should flow out from laps a minimum of 6mm (1/4") to ensure a tight seal.
  - .8 Complete perfect welds between two membranes. Leave no zone unwelded. In cold weather, adjust welding time to obtain homogenous seam (it may be necessary to slow down in certain cases.)
  - .9 Once cap sheet is installed, carefully check all overlapped joints.

.5 Cap Sheet Flashing Installation

- .1 The cap sheet flashing must be installed in one (1) metre wide strips. The side laps must overlap by 75mm (3") and must be staggered by at least 100mm (4") with respect to the joints of the cap sheet on the field surface, to avoid areas of excessive layering. The overlaps to the field surface must be 150mm (6") minimum and exceed those of the base sheet flashing overlap by at least 50mm (2"). At end laps, angle cut the corners that will be covered by the following piece.
- .2 Use chalk line to draw a straight line on the field surface 150mm (6") from the inside of the parapets, curbs, upstands, etc. Using a propane torch and round nose trowel, embed the surface of the granules in a layer of hot bitumen, starting from the chalk line on the field surface to the bottom edge of the parapet, curb or upstand.
- .3 Heat weld cap sheet flashing directly to the base sheet membrane, proceeding from top to bottom. This technique softens both membranes in order to obtain an even, continuous weld.
- .4 During installation be careful not to overheat the membrane or to create excessive bitumen bleed out at the joints.

**3.11 FLOOD COAT AND GRAVEL COVER**

- .1 Apply a flood coat of cold roofing adhesive at the rate of 5 gallons/100ft<sup>2</sup> as recommended by Manufacturer.
- .2 Then embed new approved pea stone gravel at 20 kg/m<sup>2</sup> (450 lbs/100ft<sup>2</sup>) while adhesive is still wet.

**3.12 CONCRETE PAVERS**

- .1 Install concrete pavers as indicated on the Roof Plan on top of one-inch extruded polystyrene rigid insulation (Type 4).

**3.13 METAL FLASHINGS**

- .1 Cap and counter flashings shall be jointed with a double S-type locked joint. Flashings shall be installed with continuous clips secured to wood capping blocking at 12 inches O.C.
- .2 The inside face of the metal cap flashing between the S-locked joints is to be secured with three (3) fasteners matching the colour of the metal cap with a neoprene washer between the fastener head and inside face of the metal cap flashing.
- .3 Replace any metal flashing removed from equipment fans, etc., and replace with new metal.
- .4 Fabricate and install metal copings, fascias, and counter flashing as indicated on drawings.
- .5 New counter flashing and cap flashings as detailed shall be coloured metal shapes to match existing flashing if any.
- .6 Fabricate metal flashing and other sheet metal work in accordance with applicable CRCA FL series details. Make allowance for expansion at joints. In general, flat locked seams shall be used. Seal joints watertight with approved sealant. Form sections square, true and accurate to size, free from distortion and other defects. Double back exposed edges at least 12 mm. Flashings to be fastened with clips secured to masonry walls with nail-ins by competent

mechanical fasteners or approved equal at 2'.

- .7 Counter flashings shall be installed at all reglets and curbs with at least three (3) inches below the top of roof curb or reglet.

### **3.14 PROTECTION OF WORK**

- .1 At the completion of each day's work, all exposed edges of unfinished roof membrane system must be sealed by means of a temporary water cut off.

### **3.15 FIELD QUALITY CONTROL**

- .1 Arrange for a review of the complete roofing installation by a representative of the membrane manufacturer to ensure that work has been performed in compliance with specified requirements.
- .2 Engage the roofing inspection company selected by the Architect to supervise installation of roofing and to verify its completion in accordance with this Specification for Work included in both Section 07 52 00 and 07 62 00.
- .3 Provide supervision of roofing installation by a representative of the membrane manufacturer.
- .4 Notify designated Owner's representative and roofing inspection company at least seventy-two hours before roofing operations commence, and arrange for a job site meeting to be held the day before the roofing starts with the following present: Owner's representative; Contractor's superintendent; roofing inspector; and a principal of the roofing Subcontractor's firm. Subsequently, give two working day's prior notice to the roofing inspector of the commencement of each phase of Work, and provide him with materials and installation information as required.
- .5 Payment for roofing inspection will be made from Cash Allowance listed in Section 01 21 00.

### **3.16 ADJUSTMENT AND CLEANING**

- .1 Install membrane patches over punctures and tears in membrane in strict accordance with manufacturer's written recommendations.
- .2 Remove all roofer's equipment and debris as Work progresses, and at completion of roofer's Work.
- .3 Remove all debris and soil from all areas and surfaces that was caused from roofing operations.

### **3.17 PROTECTION**

- .1 Coordinate work to ensure that special protection against damage from traffic or Work performed on top of completed roofing is installed as specified in Div 01.

**END OF SECTION**

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**PART 1 - GENERAL**

**1.1. Description**

**1.1.1. General Requirements**

- 1.1.1.1. Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.
- 1.1.1.2. Assembly to integrate and conform with the requirements of Section 01 90 00 – General Requirements for Building Envelope.

**1.1.2. Work Related to this Section Performed by Other Sections**

Section 04 00 00 – Masonry Procedures  
Section 05 31 00 – Light Gauge Metal Framing  
Section 07 21 29 – Sprayed Insulation  
Section 07 26 00 – Vapour and AirBarrier.  
Section 07 46 13 – Preformed Metal Siding and Soffit.  
Section 09 21 16 – Gypsum Board Assemblies

**1.1.3. Work Performed by this Section but Specified Elsewhere**

Section 07 92 00: To specify joint sealants.  
Section 08 71 00: Hardware  
Section 08 80 50: To specify glazing.

**1.2. System Description**

**1.2.1. Tolerances**

- 1.2.1.1. Fabricate frames to a tolerance of + 1.5 mm for vertical, horizontal, and diagonal dimensions of units under 1830 mm, and + 3 mm for dimensions greater than 1830 mm.
- 1.2.1.2. Erect component parts within following tolerances
  - : Variations from plumb:
    - :3 mm maximum variation in storey height or 3 m run, cumulative
  - :Variations from level:
    - :3 mm maximum variation in any bay or 6 m run, non-cumulative
  - :Variations from theoretical calculated plan or elevation location related to established floor lines, column lines and other fixed elements of the structure, including variations for plumb and level:
    - :Offsets in end-to-end or edge-to-edge alignment of adjoining members:
      - :1.5 mm maximum offset in any alignment.
- 1.2.1.3. Maintain tolerances for glazing as recommended by glass manufacturer.
- 1.2.1.4. Maintain locations of mullions related to, and within installed tolerances, of ceilings of walls as indicated on Drawings. Verify location of ceiling grid at each floor.

**1.2.2. Design**

- 1.2.2.1. The entire exterior skin execution shall be based on the rain screen principle.



- 1.2.2.2. The system shall provide:
  - : Such gaskets, baffles, overlaps and seals as required to provide a rain screen barrier to effectively deter rain water entry into cavities.
  - : The necessary air seals to eliminate air passage from system cavities into the building and vice versa, and to assure adequate pressure equalization of the system cavities with the outside.
- 1.2.2.3. The air and vapour seals required to eliminate air borne vapour infiltration from the building into the system cavities.
- 1.2.2.4. Openings between cavities and outside shall be of sufficient cross section to provide pressure equalization. All openings must be effectively baffled to minimize direct water entry.
- 1.2.2.5. Thermally, the grid members shall have a resistance to heat transfer equal to or better than that of the area along the bottom of the sealed glass units.

1.2.3. **Structural Requirements**

- 1.2.3.1. Entrances must withstand a minimum windload of (30 psf) 1500 Pa with a maximum deflection of span/200.

1.2.4. **Performance**

- 1.2.4.1. Air infiltration shall exceed 3.05 to the power of negative four cu.m/s/sq.m. of exterior surface at 75 Pa pressure difference.
- 1.2.4.2. There shall be no water infiltration into the building under 50% of design wind load.
- 1.2.4.3. No condensation shall form on any interior surfaces of the aluminum members before any of the exposed area of the sealed units reaches the dew point temperature.

1.3. **Quality Assurance**

1.3.1. **Glazing Requirements**

- 1.3.1.1. Conform to recommendations of Flat Glass Marketing Association (FMGA), Glazing Manual 1980 (GM) and Glazing Sealing Systems Manual 1970 (GSSM).
- 1.3.1.2. Refer to Section 08 80 50 – Glass Glazing for requirements.

1.3.2. **Subcontractor Qualifications**

- 1.3.2.1. Perform Work of this Section only by a Subcontractor approved by one of the systems manufacturers approved for this Project and who has adequate plant, equipment and skilled tradesmen to perform it expeditiously and is known to have been responsible for satisfactory installations similar to that specified during a period of the immediate past five years.  
Approved Suppliers:  
Windspec  
Kawneer  
Windspec Inc.  
Alwind Ltd.  
Alumicor

1.3.3. **Welder Qualifications**

- 1.3.3.1. Perform welding of structural components only by fabricators certified by Canadian Welding Bureau to CSA welding qualification codes; CSA Standard W47.1 for welding of steel, and CSA W47.2 for welding of aluminum.

1.3.4. **Requirements of Regulatory Agencies**

- 1.3.4.1. Conform to requirements of authorities having jurisdiction in the fabrication and installation of components specified in this Section.

1.3.5. **Codes and Standards**

Except as modified by governing codes and by the Contract Documents, comply with applicable provisions and recommendations of the following:

- 1.3.5.1. CSA W47.2-M1987 for welding of aluminum.  
1.3.5.2. CSA W59-M1989 for welding of steel.  
1.3.5.3. AAMA Aluminum Curtain Wall Design Manual.

1.4. **References**

1.4.1. **Reference Standards**

- 1.4.1.1. Reference standards quoted in Contract Documents refer to:  
1.4.1.2. ASTM A167-81a, Specification for Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip.  
1.4.1.3. ASTM A480-81, Specification for General Requirements for Flat Rolled Stainless and Heat Resisting Steel Plate, Sheet and Strip.  
1.4.1.4. ASTM A525-76, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, General Requirements.  
1.4.1.5. ASTM A780-80, Standard Practice for Repair of Damaged Hot-Dip Coatings.  
1.4.1.6. CGSB Specification 41-GP-19Ma, Rigid Vinyl Extrusions for Windows and Doors.  
1.4.1.7. CGSB Specification 79-GP-1M, Screens, Aluminum Frame, Window.  
1.4.1.8. CGSB Specification 1-GP-108M, Paint, Acid and Alkali Resistant, Black.  
1.4.1.9. CGSB Specification 1-GP-132M, Primer, Zinc Chromate, Low Moisture Sensitivity.  
1.4.1.10. CGSB Specification 1-GP-181M, Coating, Zinc Rich, Organic, Ready Mix.  
1.4.1.11. CAN/CSA3-G40.20/G40.21-M92, Structural Quality Steel.  
1.4.1.12. CSA Standard G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.  
1.4.1.13. CSA Standard W47.1-92, Certification of Companies for Fusion Welding of Steel Structures.  
1.4.1.14. CSA Standard W47.2-M1987, Aluminum Welding Qualification Code.  
1.4.1.15. CSA Standard W59-M1989, Welded Steel Construction (Metal Arch Welding).

**1.5. Submittals**

**1.5.1. Shop Drawings**

- 1.5.1.1. Submit shop drawings showing and describing in detail system assemblies, including: large scale details of members and materials, of brackets and anchorage devices, and of connection and jointing details, fully dimensioned layout for positioning of brackets and anchorage devices to structures; dimensions, gauges, thicknesses; glazing details, description of materials, including catalogue numbers, products' and manufacturers' names; aluminum alloy and temper designations, metal finishing specifications; and degree of torquing required for bolted connections; and other pertinent data and information.
- 1.5.1.2. Shop Drawings shall contain the minimum following details:  
: jamb, head and sill of units at junction of wall faces, including air vapour seal  
: structure required for system that is supplied with system and not part of building structure  
: anchorage system  
: dielectric separator details  
: separator/slip gasket details  
: thermal separator details  
: flashing details

**1.5.2. Samples**

- 1.5.2.1. Submit samples of unit frame profiles, glass and glazed sample assembly prior to fabrication of units. Sample acceptance will be for colour, appearance, glazing methods only.
- 1.5.2.2. Submit samples for each finish and colour required. Submit samples finished on the specified alloy on 600 mm lengths of extrusions or 600 mm square of sheet or plate, showing maximum range or variation in colour and shade, and matching the Architect's samples in each case. Sample submittals and acceptance shall be for colour, texture and specular gloss.

**1.5.3. Maintenance Instructions**

- 1.5.3.1. Submit maintenance instructions for incorporation into Project Data Book.

**1.6. Delivery, Storage and Handling**

- 1.6.1. Suitable storage at site shall be provided by the Contractor. Parts shall be stored in this area to permit natural ventilation over their finished surfaces.
- 1.6.2. Under conditions of high humidity, heating or forced ventilation shall be provided to prevent the accumulation of surface moisture.
- 1.6.3. Deliver, handle and store units by methods approved by manufacturer. Store units at site on wood platforms raised above grade or in enclosures protected from elements and corrosive materials, and with resilient pads provided for full bearing support of frame. Stack units vertically in manner to prevent racking. Do not remove from crates or other protective covering until ready for installation.

- 1.6.4. Protection of this work shall be the responsibility of this Section and the methods used shall be agreed with the Contractor.
- 1.6.5. Do not permit foreign materials such as splashing of concrete, mortar, plaster or paint, which could damage the finish, to remain on the surface of aluminum work. All materials of this nature must be immediately removed, and where conditions are such that this will not be possible, the exposed surface of aluminum exposed to abuse shall be protected by removable aluminized vinyl protection throughout the period that work proceeds on the building. The protective materials must be carefully removed on completion of the building, and in such a manner that no damage occurs to the aluminum finish.

## 1.7. **Warranty**

### 1.7.1. **Extended Warranty**

- 1.7.1.1. Warrant installation specified in this Section covering the period for four years beyond the expiration of the warranty period specified in the General Conditions to the Contract.
- 1.7.1.2. Without restricting the generality of the warranty, defects shall include failure to maintain true lines, plumbness and weather tightness under all conditions.
- 1.7.2. Promptly remedy defects and/or failures upon written notification that such exist. Remedy shall include labour, materials, equipment and services required to make good defective work, and to replace such work, without removal of non-defective work, and to make good any work, components and finishes and Owner's property damaged or disturbed in course of remedying defects and/or failures.

## **PART 2 - PRODUCTS**

### 2.1. **Materials**

#### 2.1.1. **Intent**

- 2.1.1.1. Framing Sections are to be nominally 50mm x 150mm thinline profile, thermally broken Curtain Wall sections.

#### 2.1.2. **Aluminum**

- 2.1.2.1. Extrusions: AA6063-T5, alloy and temper for framing, and otherwise where not exposed to suit specified and fabricator's requirements.
- 2.1.2.2. Exposed Anodized Sheet and Plate: AA 5005-H14, alloy and temper, or AA 1100-H14, anodizing quality.
- 2.1.2.3. Exposed sheets where painted: AA100-H14, alloy and temper.
- 2.1.2.4. Non-exposed sheets: AA3003-H14, alloy and temper, mill finish, or Alcan "Utility Sheet".
- 2.1.2.5. Exposed surfaces of aluminum shall be free of die marks, scratches, blisters, "leave-off" marks, or other blemishes which are visible.

#### 2.1.3. **Steel**

- 2.1.3.1. Steel Framing: To meet specified requirements of CSA Standard G40.21, Grade 300W for rolled sections and Grade 350, Class H, for hollow sections.

**2.1.4. Stainless Steel**

2.1.4.1. ASTM Specifications A480-81, and A167-81a, Type 304.

**2.1.5. Finishes**

2.1.5.1. Anodic clear coating, Architectural Class 1, AA-M12C22A41 (.0007")

**2.1.6. Glass**

2.1.6.1. Exterior: Refer to Section 08 80 50 – Glass Glazing.

2.1.6.2. Interior: Refer to Section 08 80 50 – Glass Glazing.

**2.1.7. Glazing Gaskets**

2.1.7.1. Either neoprene or EPDM (ethylene propylene diene monomer) with dimensional tolerances and durometer hardness and of suitable size and shape to meet requirements of the specifications and their specific application. Gaskets shall be virgin material as manufactured by Tremco Manufacturing Company (Canada) Limited or other approved manufacturer. Gaskets shall conform to Tremco Information Bulletins: For EPDM - TDB-460-1 or equal.  
For Neoprene - TDB-270-1 or equal.

**2.1.8. Glazing Tape**

2.1.8.1. Polyisobutylene, with continuous molded-in synthetic rubber shim, in colour selected, Polyshim Tape by Tremco (Canada) Limited, or equivalent as approved.

**2.1.9. Sealants and Sealant Materials**

2.1.9.1. To meet specified requirements of Section 07920 and design performance requirements.

**2.1.10. Fastenings**

2.1.10.1. Stainless steel, Type 300 series, or double cadmium plated steel, selected to prevent galvanic action between fasteners and components fastened. Where exposed in finished surfaces, use oval-head countersunk Phillips head screws with shank diameter one screw size smaller than the diameter of holes in fastened material, and colour to match adjacent surfaces.

**2.1.11. Exposed Anchors**

2.1.11.1. Aluminum or stainless steel with aluminum materials; and otherwise to match metal anchored. Non-exposed: as for exposed or may be galvanized steel.

**2.1.12. Bituminous Paint**

2.1.12.1. To meet specified requirements of CGSB Specification 1-GP-108.

**2.1.13. Separator/Slip Gaskets**

2.1.13.1. Nylon as suitable for connection detail at moving faces of connections.

**2.1.14. Thermal Separator**

2.1.14.1. Solid extruded and thermally resistant sections with a durometer hardness of Shore "A" 50, ±5.

**2.1.15. Supporting Angles, Plates, Bars, Rods and Other Steel Accessories**

2.1.15.1. Mild steel CAN3-G40.21-M78, thickness as required to sustain imposed loads and in no case less than 4.8mm thick.

2.1.15.2. Galvanize steel after fabrication where installed on exterior side of vapour retarder/air barrier. Prime paint steel where installed on interior side of vapour retarder/air barrier.

**2.1.16. Thermal Insulation**

2.1.16.1. Rigid glass fibre board, AF530 wall insulation manufactured by Fiberglas Canada Inc. in thickness indicated on Drawings with black coating on outer surface.

2.1.16.2. Loose Insulation: Glass fibre, density of 12 kg/cu.m., by Fiberglas Canada Inc.

**2.1.16.3. Foam Insulation**

2.1.16.3.1. One or two part, polyurethane, with a nominal density of 40 kg/m<sup>3</sup>, coefficient of linear expansion of 0.00006 mm/m/°C, water vapour transmission of 73 Ng/Pa5m<sup>2</sup> and thermal conductivity of 0.02 W/m°K.

2.1.16.3.2. Similar to products as produced by BASF Canada Inc.

**2.1.17. Hardware**

2.1.17.1. Refer to Section 08 71 10.

**2.2. Products**

2.2.1. Specified manufacturers' catalogue references to for design Intent.

2.2.2. Unspecified materials which form a part of completed assemblies shall be of manufacturers' standard.

2.2.3. Products of the following manufacturer are considered as acceptable alternatives, provided that they meet the minimum requirements of the products listed and must submit technical literature, samples, drawings and performance data for comparison:

Windspec  
Kawneer  
Alumicor Limited  
Alwind Industries

#### **2.2.4. Screens and Framing**

- 2.2.4.1. Framing: To Meet intent.
- 2.2.4.2. Finish:
  - : exterior: Clear anodized.
  - : back sections: Clear anodized.
- 2.2.4.3. Glazing: Section 08 80 50: To specify glazing.
- 2.2.4.3. Sills: extruded aluminium, with concealed anchor system or hold down clips, colour and finish to match framing.
- 2.2.4.4. Style: Combination of mullion depths, glazing rebates and caps as required by Drawings, and including door stops and cut pile weatherstripping.

#### **2.2.5. Hinged Doors**

- 2.2.5.1. Type: To meet intent. Refer to drawings for dimensions of bottom, mid and top rails and stiles.
- 2.2.5.2. Glass: Refer to Section 08 80 00 – Glass and Glazing.
- 2.2.5.2. Finish: Clear anodized.
- 2.2.5.3. Threshold: Extruded aluminum, clear finish, 12mm riser, overall width to match frames.
- 2.2.5.4. Weather-stripping: Cut pile weather-stripping and adjustable door bottoms for exterior doors.
- 2.2.5.5. Door Sweep: Refer to Section 08 71 10.
- 2.2.5.6. Hinges: Refer to Section 08 71 10.

### **2.3. Fabrication**

- 2.3.1. Ensure glazing rebate provided with depth and width to accommodate specified glass in accordance with glass manufacturer's recommendations. Install glazing gaskets anchored to aluminium extrusions.
- 2.3.2. Provide structural support for air barrier tie-in.

#### **2.3.3. Framing Members**

- 2.3.3.1. Fabricate generally to dimensions/profiles indicated on drawings. Meet specified requirements and clearances to other construction components.
- 2.3.3.2. Reinforce members and joints with steel plates, bars, rods or angles for rigidity and strength as needed to fulfill performance requirements. Use concealed stainless steel fasteners for jointing that cannot be welded.
- 2.3.3.3. Provide glass setting, supports and stops to minimize possibility of glass breakage caused by structural inadequacy of frames, stops and frame joints, solar and thermal induced forces, within limitations of specified design performance criteria, as recommended by glass manufacturer.
- 2.3.3.4. Design system to ensure that site glazing may be performed in accordance with construction scheduling within environmental limitations specified in Section 08 80 00 – Glass and Glazing.

#### **2.3.4. Assembly of Units**

- 2.3.4.1. Join members by welding where specified and otherwise where practicable.
- 2.3.4.2. Join members where specified, and otherwise where welding is impracticable, by mechanical methods. Reinforcement or fasteners visible on faces of members where exposed to view will not be acceptable.
- 2.3.4.3. Weld with electrodes and by methods recommended by the base metal manufacturer, and in accordance with CSA Standards W47.1, W47.2 and W59 as applicable, and to avoid distortion or discolouration of exposed faces. Make welds continuous unless otherwise shown. Grind exposed welds flush, to match adjacent metal.
- 2.3.4.4. Join members in shop fabricated units to fit flush with hairline joints.
- 2.3.4.5. Incorporate weepholes to drain off pocketed water. Baffle to prevent entry of driven water to conform to specified performance.
- 2.3.4.6. Except where shipping makes impossible, fabricate units in shop and ship completely assembled.

#### **2.3.5. Vapour Retarder and Air Barrier**

- 2.3.5.1. Maintain integrity of vapour retarder and air barrier system within systems installed by this Section and between systems and adjoining construction.

#### **2.3.6. Dissimilar Materials**

- 2.3.6.1. Protect material from electrolytic action when dissimilar metals are in contact with one another with two coats of bituminous paint or other approved means.
- 2.3.6.2. Protect aluminum concealed in contact with masonry with two coats of bituminous paint.

#### **2.3.7. Anchors**

- 2.3.7.1. Incorporate anchorage to structure to support units adequately when subjected to specified loads.
- 2.3.7.2. Allow for complete adjustment in anchorage for levelling and positioning of units during installation.

#### **2.3.8. Doors**

- 2.3.8.1. Fabricate doors with stiles and rails of extruded aluminum with major portions of 3mm minimum thickness.
- 2.3.8.2. Join stiles to rails with sigma deep penetration welds and mechanical fastening.
- 2.3.8.3. Provide flush glazing.
- 2.3.8.4. Incorporate weatherstripping.
- 2.3.8.5. Provide for master-keyed lock cylinders.

#### **2.3.9. Fastenings**

- 2.3.9.1. Where fastenings are exposed to dampness or moisture, use cadmium plated steel for steel-to-steel, aluminium for aluminium-to-aluminium, and stainless steel otherwise or alternatively for all above.



- 2.3.9.2. Where fastenings are not exposed to dampness or moisture, cadmium plated steel may additionally be used for all combinations of metals noted in immediately preceding sub-paragraph.

**2.3.10. Thermal Movement**

- 2.3.10.1. Fabricate exterior units and assemblies to provide for expansion and contraction of component members and between units when subjected to surface temperatures from -34 deg.C to 82 deg.C.

**2.3.11. Mullions**

- 2.3.11.1. Fabricate mullions to provide for specified thermal movement without damage to adjacent units.

**2.3.12. Dissimilar Materials**

- 2.3.12.1. Protect material from electrolytic action when dissimilar metals are in contact with one another.  
2.3.12.2. Protect aluminium concealed in contact with masonry with a heavy coating of bituminous paint.

**2.3.13. Anchors**

- 2.3.13.1. Incorporate anchorage to structure for units at sills, heads and jambs on 450mm centres generally, and to support units adequately when subjected to specified loads.  
2.3.13.2. Allow for complete adjustment in anchorage for levelling and positioning of units during installation.

**2.3.14. Attachment of Hardware**

- 2.3.14.1. Match hardware fastenings to metal of hardware.  
2.3.14.2. Attach hardware by bolts or machine screws into tapped reinforcing plates.

**2.3.15. Weatherstripping**

- 2.3.15.1. Secure weatherstripping in place by mechanical means only, and in a manner to enable its removal and replacement without special tools.  
2.3.15.2. Ensure that continuity of weatherstripping is maintained around openings.  
2.3.15.3. Install adjustable metal backed pile cloth weatherstripping recessed in stiles at jamb locations provided with latches and butt hinges, and in top rails of doors.  
2.3.15.4. Install adjustable sweeps at bottom rails of doors.

**2.3.16. Thermal Break**

- 2.3.16.1. Incorporate a thermal break in frames in which insulating glass units are installed.

### **2.3.17. Finishing**

- 2.3.17.1. For surfaces with zinc coating, clean and smooth ground surfaces at welds and prime areas from which zinc has been removed with a coating of zinc rich paint of minimum 0.102 mm thickness. Immediately following damage to galvanized protection prepare and repair surfaces to meet specified requirements of ASTM Specification A780.

## **PART 3 - EXECUTION**

### **3.1. Examination**

- 3.1.1. Take critical site dimensions to ensure that adjustments in fabrication or installation are provided for, that allowance is made for possible deflection of structure at heads, and that clearances to other construction have been maintained.
- 3.1.2. Ensure that anchors and inserts, installed by others, are adequate to meet specified requirements, and make adaptations before installation.

### **3.2. Installation**

#### **3.2.1. General**

- 3.2.1.1. Coordinate fabrication of components specified in this Section with requirements of other Sections to ensure proper anchorage and fitting.
- 3.2.1.2. Install components and units plumb, level and in accordance with shop drawings, by qualified experienced tradesmen and to conform to fabricator's instructions at location of testing and at site.
- 3.2.1.3. Do not force units into place, nor superimpose on them loads for which they were not designed.
- 3.2.1.4. Install vapour retarder and air barrier to ensure complete continuity and integration of vapour retarder and air barrier system.
- 3.2.1.5. Provide structural support for air barrier to prevent its displacement or its loss of seal when subjected to forces specified for design performance.
- 3.2.1.6. Install metal flashing to drain cavities in system. Secure flashings permanently to prevent displacement, leaks, and noise.
- 3.2.1.7. Provide for thermal movement to take place between shop fabricated assemblies and between assemblies and adjacent construction.
- 3.2.1.8. Secure units by non-corrosive anchorage materials. Use of wood or fibre is not acceptable.
- 3.2.1.9. Conceal anchors, clips, blocking, and all other attachments.
- 3.2.1.10. Install reinforcing and supporting members as indicated and required structurally as part of the work of this Section.
- 3.2.1.11. Seal metal-to-metal joints between components included in the work of this Section to ensure a weathertight assembly, and in accordance with sealant manufacturer's specifications.
- 3.2.1.12. Install insulation where aluminum is exposed to the exterior to ensure that thermal conductance to interior of building is no more than thermal conductance of insulating glass units.
- 3.2.1.13. Install units with consideration for finish variations. Abrupt variations of appearance or colour in adjacent components will not be acceptable without approval before installation.

- 3.2.1.14. Coat all damaged prime painted surfaces of anchorage with rust inhibiting paint after welding is completed.
- 3.2.1.15. Apply two coats zinc rich paint to metal surfaces bared by removal of galvanizing.
- 3.2.1.16. Apply one coat of prime paint to metal surfaces bared by removal of shop applied primer.

3.2.2. **Welding**

- 3.2.2.1. Perform welding in accordance with CSA Specification W59-1977. Exercise care during welding to minimize effect of welding heat. Design welds to prevent tearing at end of welds which could cause a progressive failure.
- 3.2.2.2. Detailed welding procedure covering specified welds on erection and shop drawings may be requested for approval by the Consultant.
- 3.2.2.3. Take precautions during welding to prevent damage or staining of adjacent surfaces.
- 3.2.2.4. Remove prime paint from surfaces to be welded.

3.2.3. **Caulking**

- 3.2.3.1. Caulk joints between frame members and sills and adjacent construction as a part of the work of this Section and in accordance with Section 07 92 13 – Joint Sealants.

3.2.4. **Glazing**

- 2.3.17.2. Install glass in units, as part of work of this Section and in accordance with Section 08 80 00. Include manufacturer's standard glazing components to create prime seals.

3.3. **Adjustment and Cleaning**

3.3.1. **Adjusting**

- 3.3.1.1. Adjust doors to operate smoothly and fit tightly when closed and locked.
- 3.3.1.2. Adjust hardware to operate smoothly, with proper tension and lubricate.
- 3.3.1.3. Ensure that weather-stripping does not cause binding to prevent closing and locking, and that it makes weathertight contact.
- 3.3.1.4. Adjust closers after doors are glazed, and other hardware and vestibule doors are installed.

3.3.2. **Cleaning on Completion of Installation**

- 3.3.2.1. Remove deposits which affect appearance or operation of units.
- 3.3.2.2. Remove protective materials.
- 3.3.2.3. Clean interior and exterior surfaces by washing with clear water; or with water and soap or detergent; followed by a clear water rinse.
- 3.3.2.4. Clean and restore stained metal surfaces in accordance with manufacturer's recommendations. Replace if cleaning is impossible.
- 3.3.2.5. Final cleaning is further specified in Division 01.

**3.4. Protection**

- 3.4.1. Immediately upon completion of installation, suitably protect vulnerable edges, and exposed corners and surfaces. Protection shall prevent damage by mortar, paint or other hazards from the work of other trades.
- 3.4.2. Protect prefinished surfaces of metal with protective coatings or wrappings to remain in place until construction completion. Use materials recommended by finishers or manufacturers of metals to ensure that method is sufficiently protective, easily removed, and harmless to finish.
- 3.4.3. Remove protection from metal glazing surfaces before installation of glass.
- 3.4.4. Maintain protection from time of installation to final clean up in accordance with Division 01.

**End of Section**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- .1 General Requirements
  - .1 Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.

**1.02 SECTION INCLUDES**

- .1 Glass and glazing for sections referencing this Section for products and installation.
- .2 Sealed insulating glass units (IGU)
- .3 Glass films (FILM)
- .4 Glass films Vision Strips (VS)
- .5 Back Painted Glass (BPG) (SP)
- .6 Laminated Tempered Plate Glass (LTPG-1) 8mm Clear Interlayer
- .7 Laminated Tempered Plate Glass (LTPG-2) 8mm Frosted Translucent Interlayer
- .8 Laminated Tempered Plate Glass (LTPG-3) 6mm Frosted Translucent Interlayer
- .9 Heat Tempered Safety Glass (SGIU)

**1.03 RELATED REQUIREMENTS**

- .1 Section 08 11 00 Metal Doors and Frames
- .2 Section 08 44 00 Aluminum Framed Glazing Systems
- .3 Section 08 41 26 All Glass Doors

**1.04 REFERENCE STANDARDS**

- .1 Canada General Standards Board
  - .1 CAN/CGSB-12.2 – M91(2017) Flat, Clear Sheet Glass
  - .2 CAN/CGSB-12.1-2017, Safety Glazing
  - .3 CAB/CGSB-12.3-M91(R2017), Flat, Clear Float Glass.
  - .4 CAN/CGSB-12.8-2017, Insulating Glass Units.
  - .5 CAN/CGSB-12.10-M76, Glass, Light & Heat Reflecting
  - .6 CGSB Specification 19-GP-5M, Sealing Compound, One Component, Acrylic Base, Solvent Curing.
  - .7 CAN/CGSB-19.13-M87, Sealing Compound, One Component, Elastomeric, Chemical Curing.
  - .8 CAN/CGSB-19.24-M90, Sealing Compound, Multi-Component, Chemical Curing.

#### 1.04 PERFORMANCE REQUIREMENTS

- .1 Size glass to withstand dead loads and positive and negative live loads acting normal to plane of glass as calculated in accordance with the Ontario Building Code and to withstand design pressures specified in applicable sections.
- .2 Where glass extends from 1070 mm to floor, design lateral loads, in addition to other load requirements, in accordance with applicable codes.
- .3 Unless otherwise specified, limit glass deflection to  $L/175$  or flexure limit of glass with full recovery of glazing materials, whichever is less.
- .4 Provide tempered, laminated, laminated-heat strengthened and heat soaked glass and related fittings and hardware in doors, side lites, screens, storefronts, glazed curtain walls, and glazed guard rails in accordance with applicable codes and as indicated or scheduled.
  - .1 Unless otherwise specified or indicated, provide tempered glass where sill of glass is less than 300 mm above finished floor.
  - .2 Unless otherwise specified or indicated, provide laminated-heat strengthened and heat soaked glass where glass is a guard.
- .5 Sealed Insulating Glass Units: Provide units free of the following characteristics:
  - .1 Appearance of condensation between panes.
  - .2 Obstruction of vision at unit perimeter.
  - .3 More than 10 percent measurable deterioration of thermal transmission or shading coefficient values.
  - .4 Chipping, cracking, or breakage of glass panes occurring due to manufacturing defects or under specified service conditions.
  - .5 Migration of edge spacer.

#### 1.03 SUBMITTALS

- .1 Submit Samples in accordance with section 01 30 00
- .2 Submit two 300 mm x 300mm samples of each specified type of glass, including tinted glass.

#### 1.04 SITE CONDITIONS

- .1 Environmental Conditions
  - 1. Proceed with glazing only when glazing surfaces are accumulating no moisture from rain, mist or condensation.

2. When temperature of glazing surface is below 4°C, obtain approval of glazing methods and protective measures which will be used during glazing operations.

## 1.05 WARRANTY

- .1 Extended Warranty, Insulating Glass Units
  - .1 Warrant insulating glass covering the period for four years beyond the expiration of the warranty period specified in the General Conditions to the Contract. Without restricting the generality of warranty, defects shall include
    - .1 warping of spacer blocks;
    - .2 dust or film of fogging formation on internal glass surfaces resulting from any cause except glass breakage;
    - .3 glass breakage except form impact by solid objects, or cause by failure of unit edge binding or of framing within limitations of specified performance criteria.
  - .2 Contractor agrees to make good defects and replace defective units. Replacement shall include removal of defective unit and installation of replacement unit. Fogging of glass inside sealed units will be considered sufficient evidence of loss of seal.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- .1 Label each piece of glass, and each container of glazing compound or sealant to indicate manufacturer, type, and quality. Leave labels on glass until final cleaning.

### 2.02 GLASS

- .1 **Single Glazed Interior Units (SGIU)**
  - .1 Warm edge,
  - .2 IGMAC Certified.
  - .3 Float Glass Thickness: 6mm minimum or as required to meet design requirements.
- .2 **Laminated Tempered Plate Glass (LTPG)**
  - .1 Warm edge,
  - .2 IGMAC Certified.
  - .3 LTPG-1 Float glass Thickness: 8mm minimum or as required to meet design requirements.
    - .1 Tempered as required to meet design requirements.
    - .2 Glazing film clear interlayer to architects selection where noted.
  - .4 LTPG-2 Float Glass Thickness: 8mm minimum or as required to meet design requirements.
    - .1 Tempered as required to meet design requirements.
    - .2 Glazing film frosted interlayer to architects selection where

noted.

- .5 LTPG-3 Float Glass Thickness: 6mm minimum or as required to meet design requirements.
  - .1 Tempered as required to meet design requirements.
  - .2 Glazing film frosted to architects selection where noted.

**.3 Insulating Glass Units (IGU)**

- .1 Insulating Glass to: CAN/CGSB – 12.8 Double unit. Glass to : CAN/CGSB -12.1 – Safety Glass.
- .2 Warm edge, hermetically sealed, minimum 6mm each lite. Minimum 13 mm space – argon filled double sealed (primary to be polyisobutylene, secondary to be polysulphide or structural silicone glazed units), desiccant filled Bayform “Thermal Edge” spacer (black) with splice connectors at corner of each glass unit.
  - .1 IGMAC Certified.
  - .2 Low E coating on surface #3.
  - .3 Acceptable Products
  - .4 AGC/AFGD’Comfort Ti-AC 40’
  - .5 PPG ‘Solarban 60’
  - .6 Cardinal ‘LoE2 -172’
  - .7 Versalux
  - .8 Viracon ‘Solarscreen 2000 VE 1-2M’
- .3 Glass Thickness: 6mm minimum or as required to meet design requirements.
- .4 Glass Type: Annealed, heat strengthened, or tempered as required to meet design requirements.

**.3 Performance Requirements:**

- .1 Visible light: 68 - 70%.
- .2 Winter night-time Metric U-value = 1.7
- .3 Shading Coefficient: within 0.43 - 0.46.
- .4 Solar heat gain coefficient: within 0.37 - 0.40.
- .5 Glass Colour: Tinted, as selected by the architect unless otherwise noted.
- .6 Type 1 exterior lite: tinted, tempered, body colour by architect.
- .7 interior lite: clear, low emissivity coating on third surface
- .8 Type 2 exterior lite: tinted, tempered, body colour by architect
- .9 interior lite: clear, tempered, low emissivity coating on third surface of interior lite.
- .10 Type 3 Spandrel Glass to CAN/CGSB – 12.9, Opaque (opacicoart) Custom Colour, min. 6mm. Type 1 – Tempered, Class A float glass, silicone coated, form I –insulating Glass.

**.4 Annealed (float) glass:**

- .1 Clear, annealed glass, 6mm thick minimum as required to meet design requirements. To CAN/CGSB-12.3. Glazing Quality. As and where noted - Acid Etched or sand blasted with clear coat finish.



### 2.03 HEAT TREATED SAFETY GLASS (SGIU)

- .1 Tempered glass to meet specified requirements of CAN/CGSB-12.1. transparent, Type 2 and tinted, Herculite K, by PPG Canada Inc.
- .2 Tempering shall be performed in a convection type oven.
- .3 Tempering and heat strengthened glass shall be treated prior to application of reflective or paint coatings.
- .4 Tempered glass tempered to minimize distortion. Roll-wave distortion not to exceed 0.127mm from peak to valley.
- .5 Orient tempered glass in manner to achieve consistent appearance.
- .6 Thickness: 16mm for All Glass Doors Section 08 41 26.

### 2.04 MIRRORS:

- .1 Annealed glass to ASTM C 1503.
- .2 Grade: Mirror cut size.
- .3 Sizes as indicated for washroom areas.
- .4 Quality: Mirror select quality, allowable distortion shall be less than 80 degrees vision interference angle to ASTM 1036-01.
- .5 Quantity: 12
- .6 Size: 600w X 900h.
- .7 Colour: Clear
- .8 Thickness: 6mm.
- .9 Exposed edges shall be ground and polished.
- .7 Products supplied by AFG Glass Inc. are considered as acceptable alternatives.

### 2.05 GLAZING ACCESSORIES

- .1 Glazing Gaskets: Preformed, EPDM, Silicone compatible, to ASTM C864 and ASTM C1115. Eternaflex by Gibson-Homans Co., Parifex by Parr Sealants, 303 Glazing Tape by P.T.I. Sealants Limited, or Tremco 440 by Tremco (Canada) Ltd.
- .2 Setting Blocks: Neoprene, of durometer hardness of Shore "A" 40 to 50.
- .3 Spacer Shims: Neoprene, of durometer hardness of Shore "A" 40 to 50.
- .4 Hardware - Section 08 41 26 All Glass Doors: All door hardware by CRL - 12mm - 16mm glass thickness. Brushed Nickle as supplied by C.R. Laurence.

### 2.06 GLAZING SEALANTS

- .1 Any of the following specified sealants as utilized for approved glazing system will be acceptable.
- .2 Incorporate sealants as incorporated in manufacturer's standard glazing systems as approved.
- .3 Ensure that glazing sealants are completely compatible with insulating glass unit sealants.
- .4 One Part Acrylic Glazing Sealant: To meet specified requirements of CGSB Specification 19-GP-5, in glazing hardness grade.
- .5 One Part Silicone Glazing Sealant: To meet specified requirements of CAN/CGSB-19.13, in glazing hardness grade.
- .6 One Part Polysulphide Glazing Sealant: To meet specified requirements of CAN/CGSB-19.13, in glazing hardness grade.
- .7 Two Part Polysulphide Sealant: To meet specified requirements of CAN/CGSB-19.24, in glazing hardness grade.

## 2.07 FILMS

- .1 Glazing film (FILM1): monolithic translucent film 0.38mm.
  - .1 Product: Security Film, Armourcoat Glass Guard by Ultimate Reflections, Fasara by 3M or other suppliers as noted previously in specifications sections appropriate to glazing condition.
  - .2 Colour, pattern and finish: Frosted transparent finish, to be later selected by consultant from manufactures standard range.
- .2 Glazing film (FILM2): monolithic translucent film 0.38mm.
  - .1 Product: Security Film, Armourcoat Glass Guard by Ultimate Reflections, Fasara by 3M or other suppliers as noted previously in specifications sections appropriate to glazing condition.
  - .2 Colour, pattern and finish: Frosted translucent finish, to be later selected by consultant from manufactures standard range.
- .3 Surface Applied Vision Strip Glazing film (FILM3): monolithic translucent film 0.38mm. Section 08 41 26 All Glass Doors
  - .1 Product: Security Film, Armourcoat Glass Guard by Ultimate Reflections, Fasara by 3M or other suppliers as noted previously in specifications sections appropriate to glazing condition.
  - .2 Colour, pattern and finish: translucent finish, Colours and Frost to be later selected by consultant from manufactures standard range.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- .1 General
  - .1 Install materials in accordance with manufacturer's specification, and ensure that each material in a glazing system is compatible with the others.
  - .2 Ensure that projections have been removed from rebates and that sufficient width and depth clearances are provided for specified glass.
  - .3 Remove stops and store during glazing to avoid damage to them.
  - .4 Remove excess glazing sealants from adjacent surfaces, including glass, during working life of material, and by methods not harmful to the surfaces.
  - .5 Collect broken glass and cuttings in boxes and remove from site.
  - .6 Do not set any glass without glazing beds or gaskets.

### 3.02 GLASS

- .1 Install glass in thicknesses to comply with Ontario Building Code requirements.
- .2 Cut glass to fit openings and to allow clearances which will ensure that glass is held firmly in place and is not subjected to stresses.
- .3 Ensure that glass edges are clean cut, not nipped or seamed.
- .4 Do not cut or nip tempered glass to fit. Replace oversize or flared lights with entirely new units of proper dimensions.

### **3.03 GLAZING AND PREPARATION METHODS**

- .1 Clean glazing rebate surfaces of all traces of dirt, dust, or other contaminants.
- .2 Use glazing sealants without addition of thinners and from only containers with seals unbroken until opened for use.
- .3 Prime all glass rebates for materials affected.
- .4 When glazing commences, arrange for the presence of a technical representative of the glazing materials manufacturer to advise on procedures and methods.
- .5 Ensure that glazing sealants and tapes are in full contact with glazing surfaces.
- .6 Tool gunned sealants with a slight bevel away from glass faces.

### **3.04 POSITIONING GLASS**

- .1 Support glass, in lights of over 2540 mm perimeter, by two setting blocks, one at each quarter point of each light.
- .2 Center glass in rebates. Use spacer shims in lights of over 2540 mm perimeter. Set shims on all four sides of lights at a maximum of 300 mm from the ends and 600 mm o.c. in between.
- .3 Set shims to allow a space of no less than 6 mm between shim edges and sight lines.
- .4 Spacer shims are not required where glazing tape is used.

### **3.05 BEDDING AT FIXED STOPS**

- .1 Apply sealants in sufficient beads that when glass is pressed into place they ooze out slightly.
- .2 Cut tapes of full depth of stop accurately to length on a work table. Set sill and head tapes first at full length of rebated opening. Butt jamb tapes into sill and head tapes tightly to weld them together. Remove protective paper backing only when glass is ready for setting, and ensure that butted joints of tape are positively filled with applied sealant.
- .3 Cut tapes accurately to length on a work table and install in a width less than stop height, so that tape edges are held 5 mm behind sight lines. Set sill and head tapes first at full length of rebated opening. Butt jamb tapes into sill and head tapes tightly to weld them together. Remove protective paper backing only when glass is ready for setting, and ensure that butted joints of tape are positively filled with applied sealant. After glass is set, fill void over top of tape to sight line by gunning in topping sealant.
- .4 Apply heel beads of sealant between edges of glass and frame, except at insulating or heat absorbent glass exceeding 2540 mm perimeter. Fill voids entirely with heel bead, and to ensure a minimum bite on glass of 5 mm.
- .5 Apply heel beads at insulating and heat absorbing glass, at lights exceeding 2540 mm perimeter to fill entire voids under glass at sills and for slight distance up each jamb, and at remaining perimeter of lights, in a bead only partially filling void and into which removable stops are set. Ensure a minimum 5 mm bite on glass at each heel bead.

**3.06 BEDDING AT STOP BEADS**

- .1 Apply sealants to glazing face of stop. Press stops into place using spacer shims, and tool sealant at a slight bevel away from glass face. Fasten stops if design requires.
- .2 Apply tape to removable stops as specified for fixed stops and with top of tapes held 5 mm behind sight lines. Press stops into place and fasten if design requires. Fill void over top of tape to sight line by gunning in topping sealant, and tool to slight bevel away from glass face.

**3.07 ADJUSTMENT AND CLEANING**

- .1 Replace scratched, etched, or defective glazing resulting from manufacture, setting, handling, or storage before or during installation. Glass accidentally broken or physically damaged, by other than faulty glazing or materials, after glazing by this Section has been completed shall be replaced as specified in Section 01 71 00.
- .2 Final cleaning of glass is specified by Section 01 71 00.
- .3 Remove stains, deposits, marks or blemishes caused by this Section from surfaces of all materials exposed to view. Replace materials that cannot be cleaned to appear as new.

**3.08 PROTECTION**

- .1 Following glazing, mark each light of glass, except heat absorbing, to indicate its presence with a material, easily removable and harmless to glass.

**END OF SECTION**

**Final Stage Renovation  
Our Lady of Fatima  
St. Clair Catholic District School Board  
Chatham, Ontario**

**Chorley + Bisset Ltd.  
Consulting Engineers  
London, Ontario**

**7 May 2020**

**Page 1 of 1**

## **ADDENDUM NO. 5**

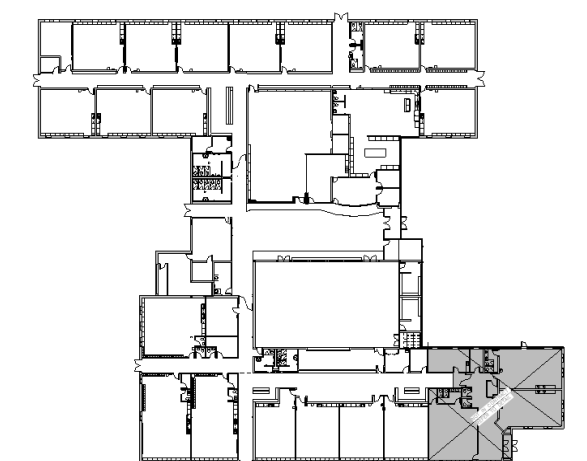
Make the following amendments and additions to the Drawings and Specifications, and include this cost in the Contract Price.

### **1. MECHANICAL SPECIFICATIONS**

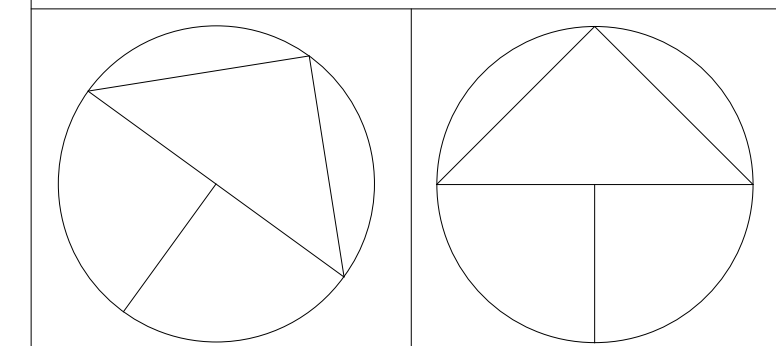
#### **1. Section 15800 - Air Distribution**

1. Clause 2.7.2 (High Induction GRD's): Add "Klimaoprema" to the list of equals.

**END OF ADDENDUM NO. 5**



KEY PLAN



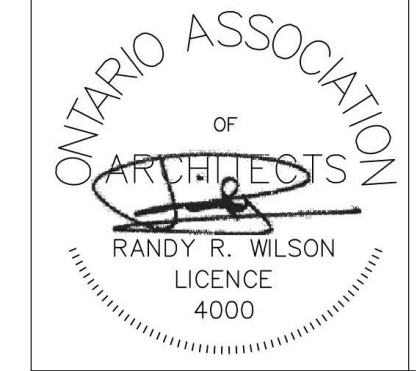
TRUE NORTH CONSTRUCTION NORTH

NOTES

LEGEND

NUMBER INDICATES ADDENDUM #

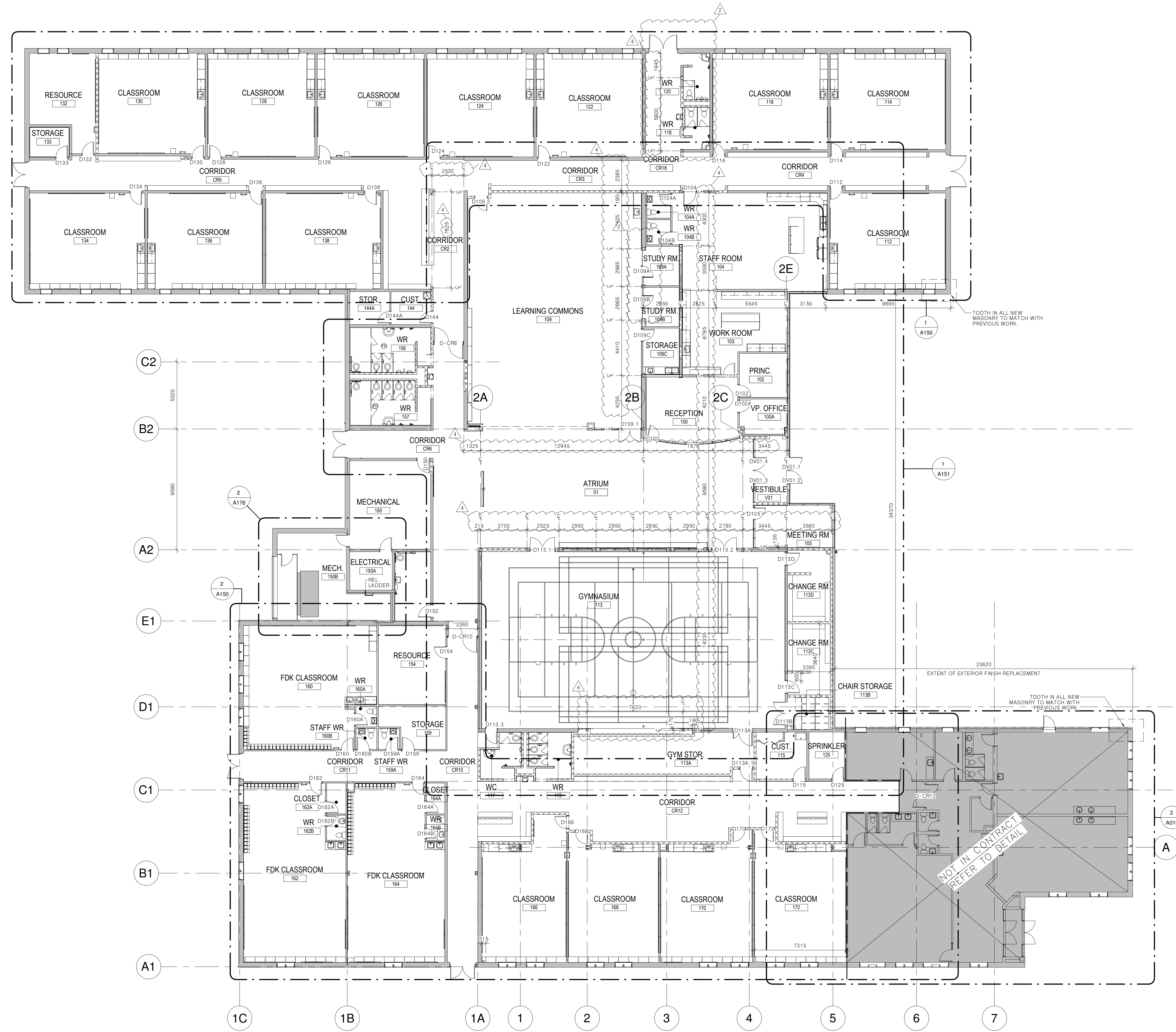
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2	05/03/2020	ADDENDUM 002
3	30/03/2020	ADDENDUM 003 - NO DRAWING CHANGES
4	03/20/2020	ADDENDUM 004
5	04/30/2020	ADDENDUM 005



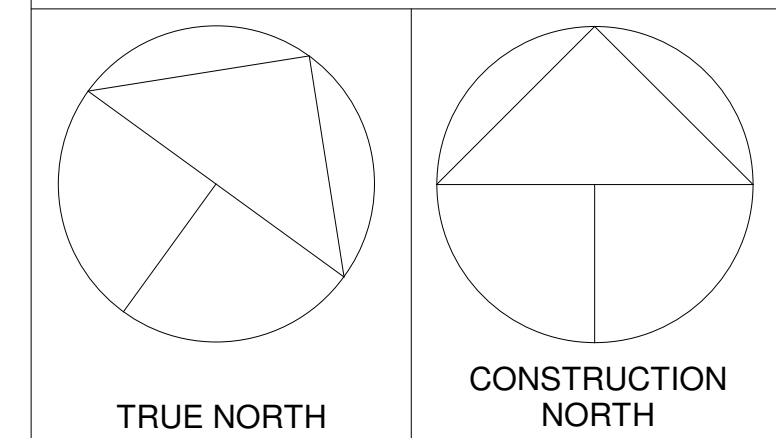
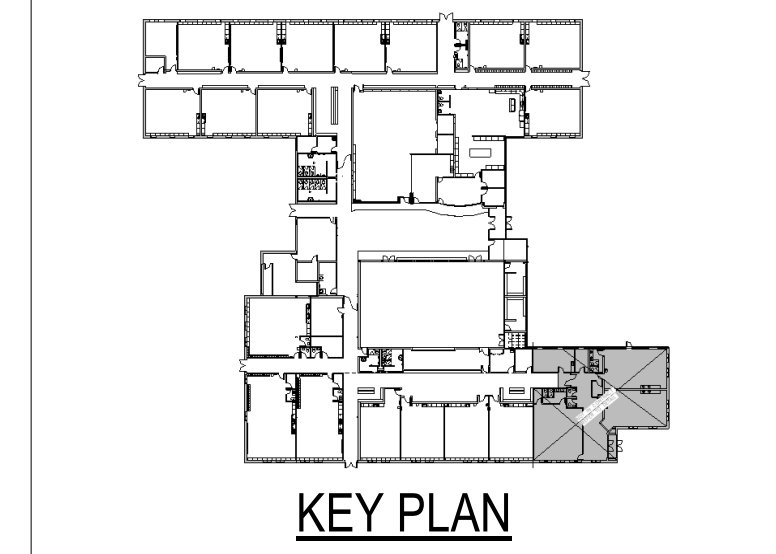
PROJECT TITLE  
**OUR LADY OF FATIMA - PHASE 4**

DRAWING TITLE  
**CONSTRUCTION FLOOR PLAN**

DATE PLOTTED 5/7/2020 11:03:07 AM	DRAWN BY MFPU	DRAWING No.
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PROJECT No.	1901	



**1 CONSTRUCTION FLOOR PLAN**  
 SCALE 1 : 150



**NOTES**

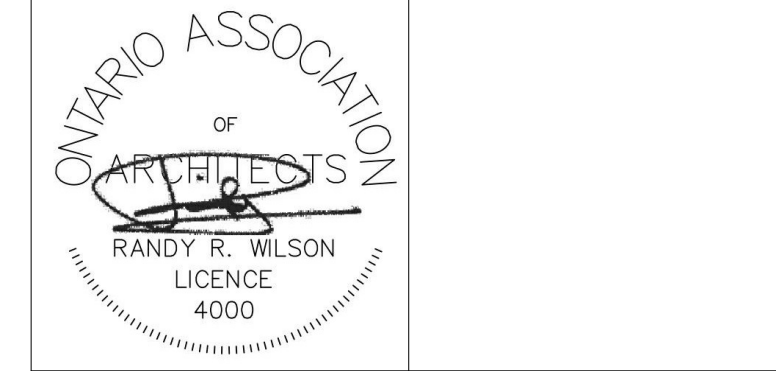
**LEGEND**

- EXISTING WALLS REMAINING
- NEW BLOCK WALL
- NEW GYPSUM BOARD WALL
- FOLDING METAL GRILLES

NUMBER INDICATES ADDENDUM #

No.	DATE	DESCRIPTION	REV.
5	04/30/2020	ADDENDUM 005	△
4	03/20/2020	ADDENDUM 004	△
3	30/03/2020	ADDENDUM 003 - NO DRAWING CHANGES	△
2	05/03/2020	ADDENDUM 002	△
1	19/02/2020	ISSUED FOR TENDER & PERMIT	△

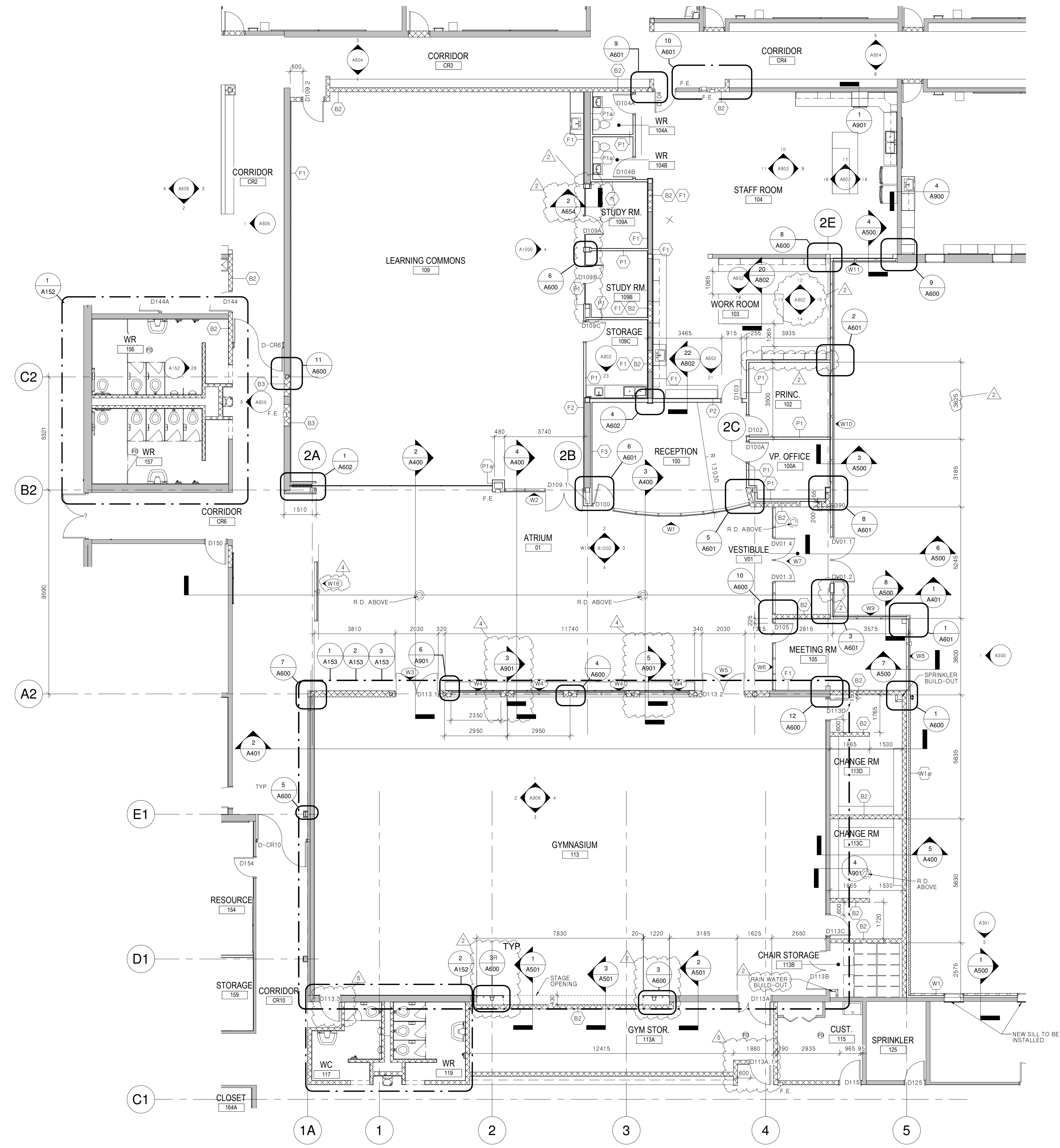
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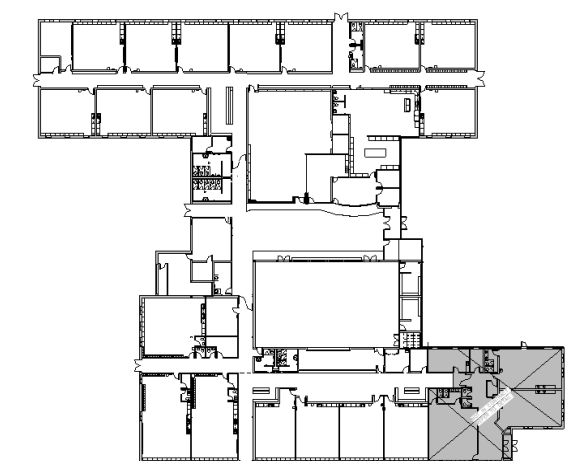
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**OUR LADY OF FATIMA - PHASE 4**

DRAWING TITLE  
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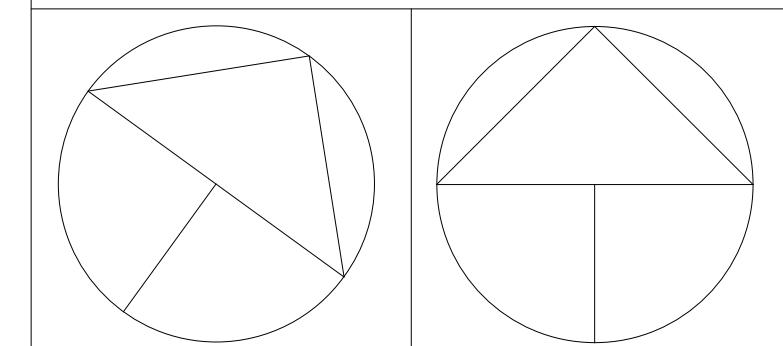
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SCALE As indicated	CHECKED BY RRW	<b>A151</b>
PROJECT No.		1901



**1 ENLARGED GYM & ENTRY FLOOR PLAN**  
 SCALE 1 : 100



KEY PLAN



TRUE NORTH CONSTRUCTION NORTH

NOTES

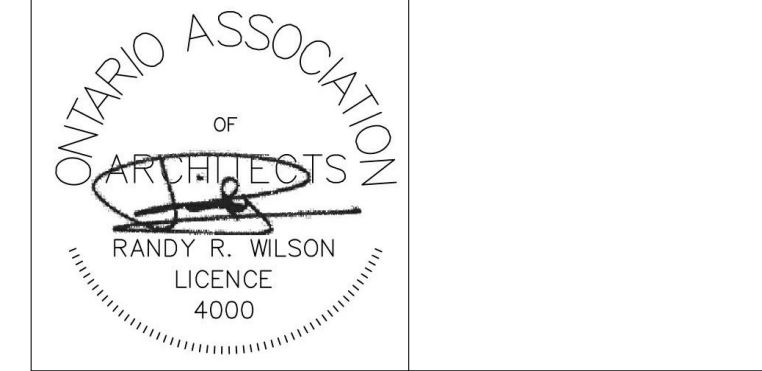
ALL EXISTING ROOF DRAINS TO BE REPLACED ON NEW ROOFING AREAS.

LEGEND

- AREA OF NEW ROOFING TYPE AS NOTED (R1) (R2)

NUMBER INDICATES ADDENDUM #

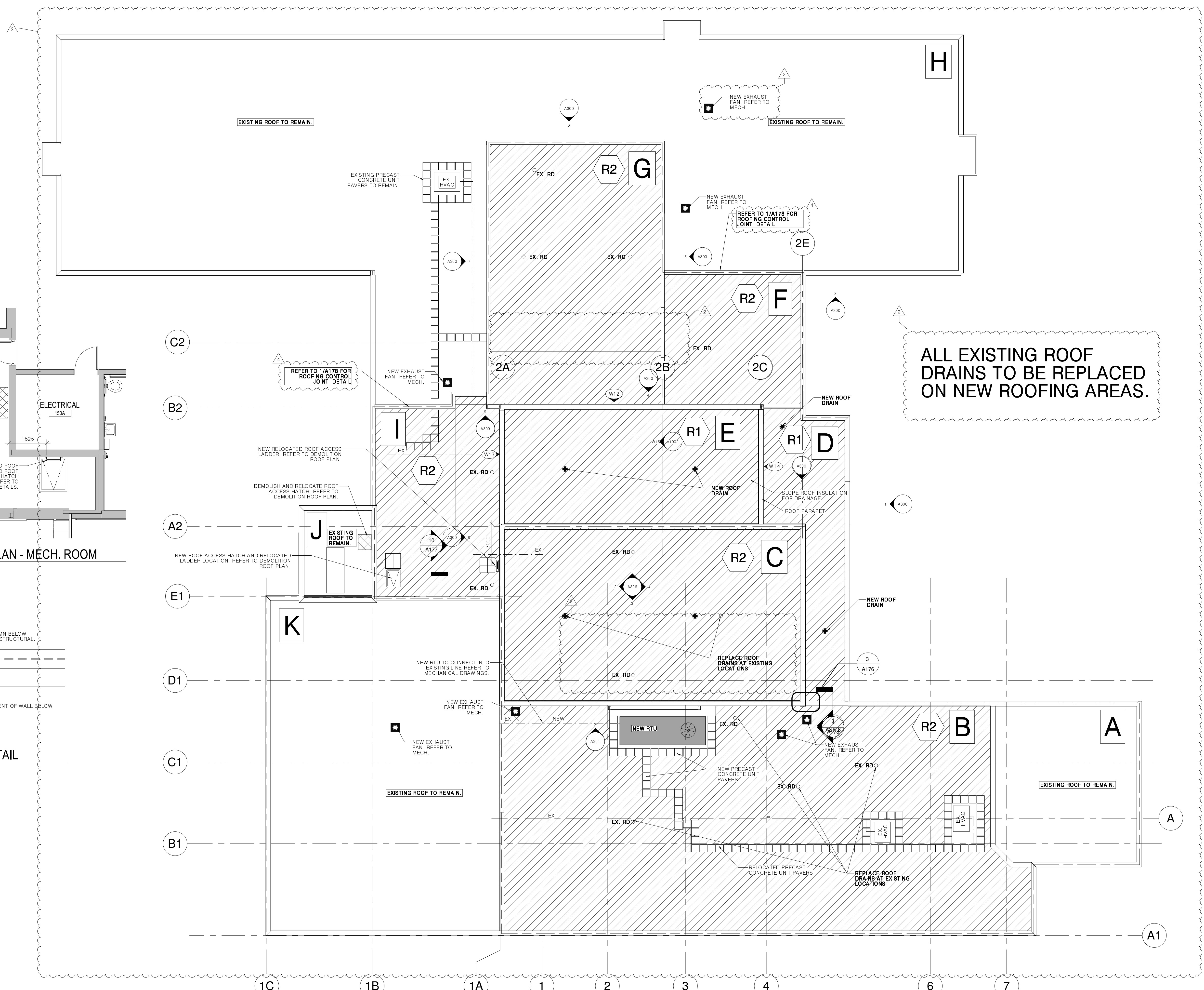
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2	05/03/2020	ADDENDUM 002	
1	19/02/2020	ISSUED FOR TENDER & PERMIT	



PROJECT TITLE  
**OUR LADY OF FATIMA - PHASE 4**

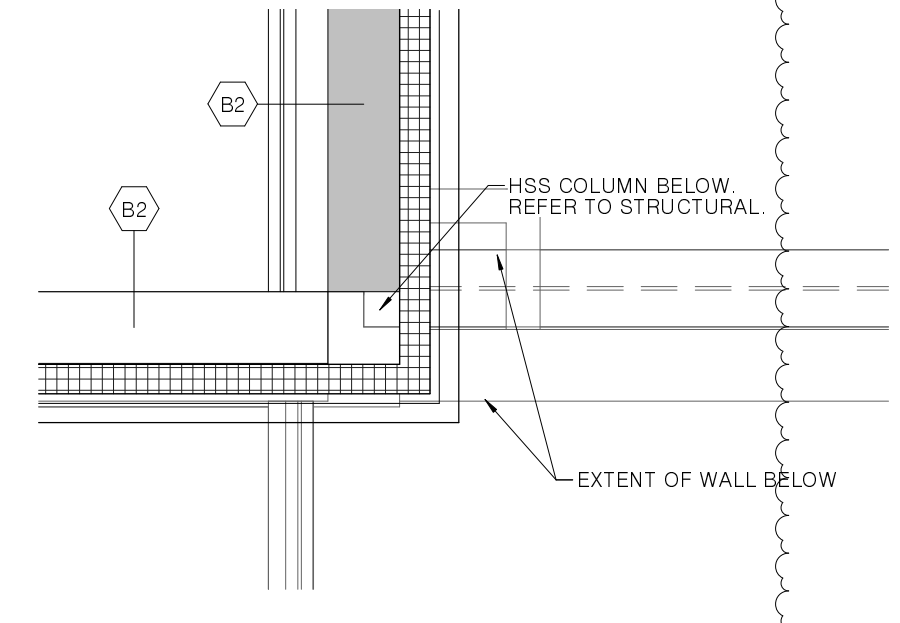
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**CONSTRUCTION ROOF PLAN**

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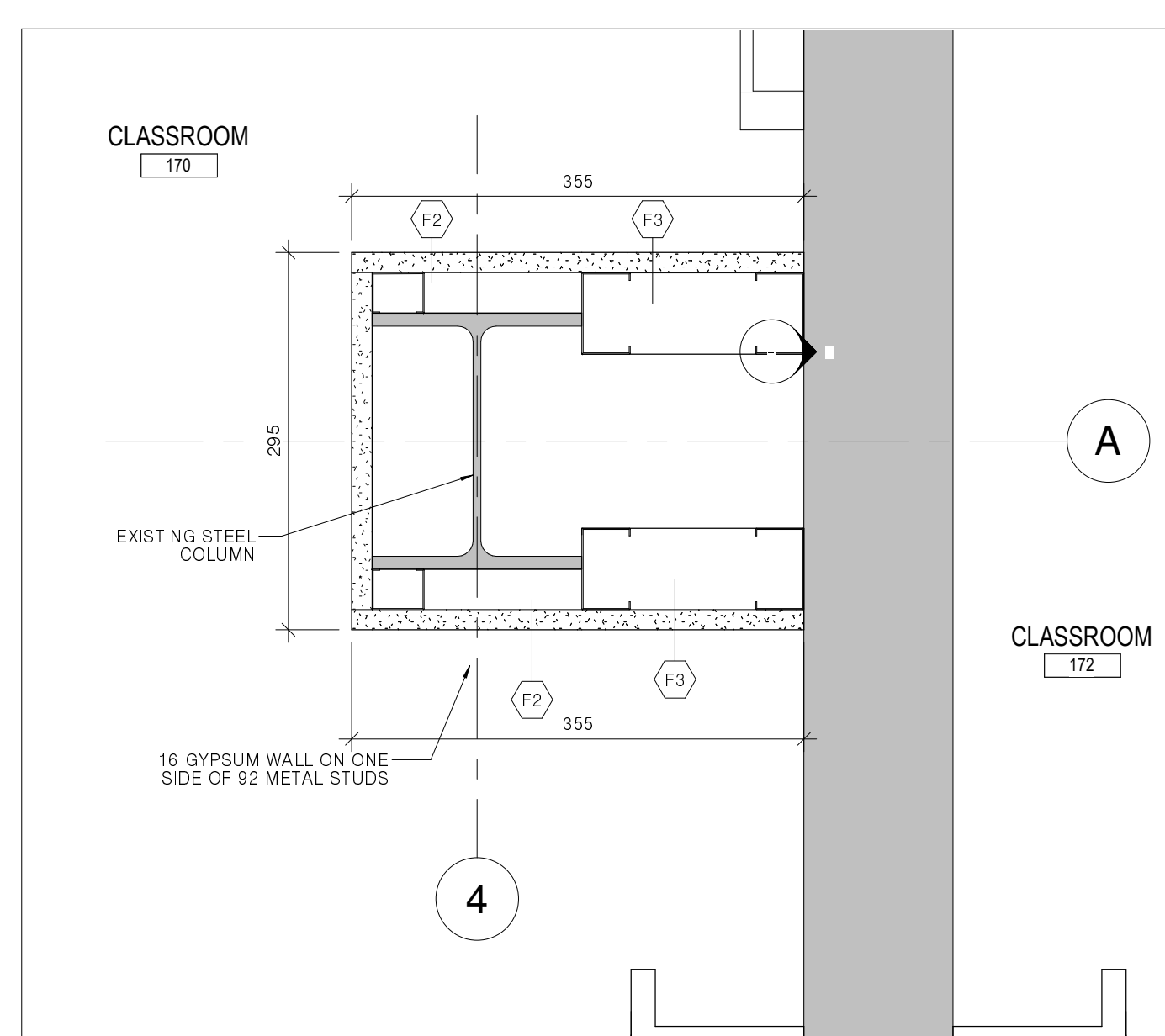
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2 CONSTRUCTION FLOOR PLAN - MECH. ROOM SCALE 1:75

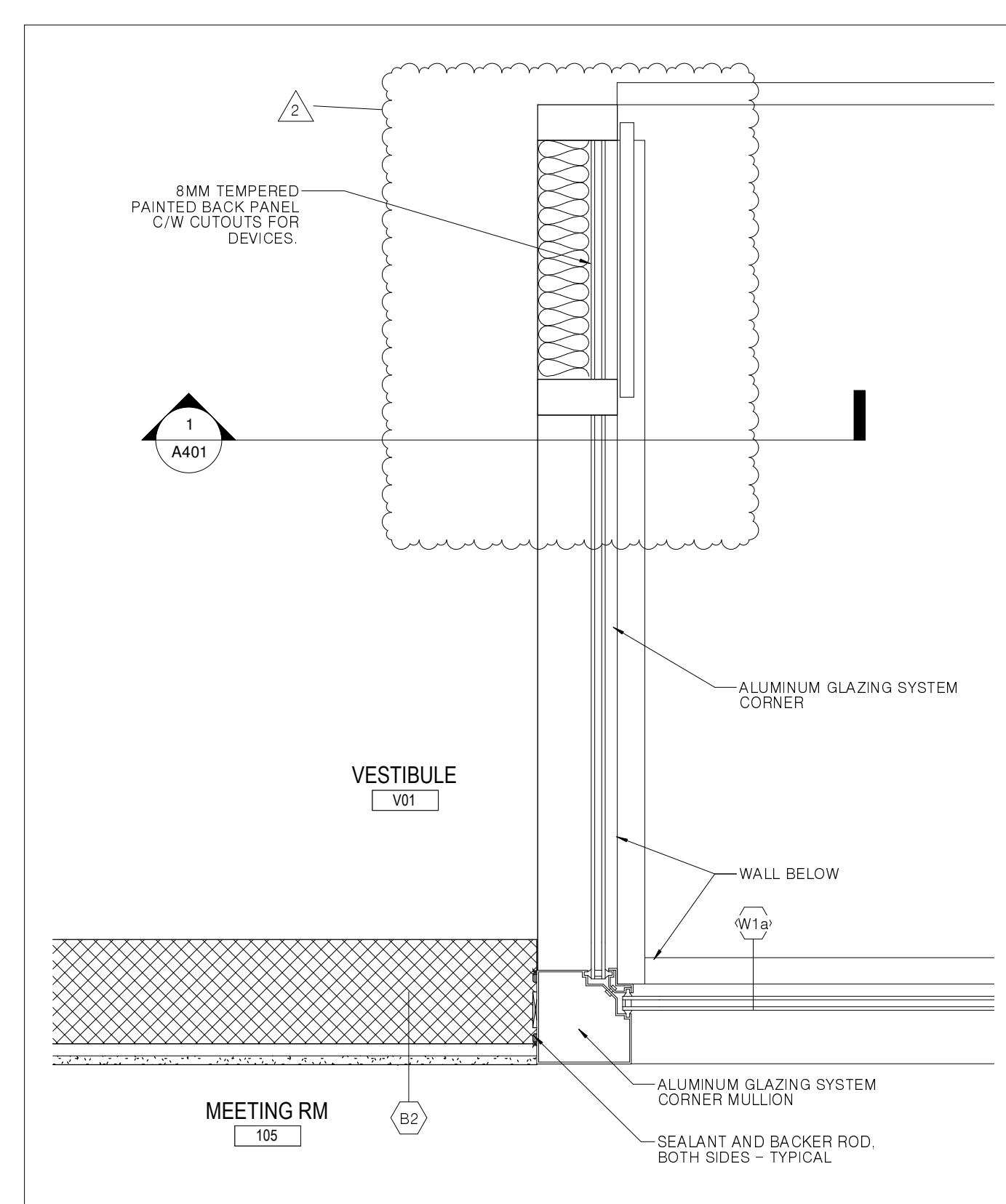


3 EXTERIOR WALL PLAN DETAIL SCALE 1:20

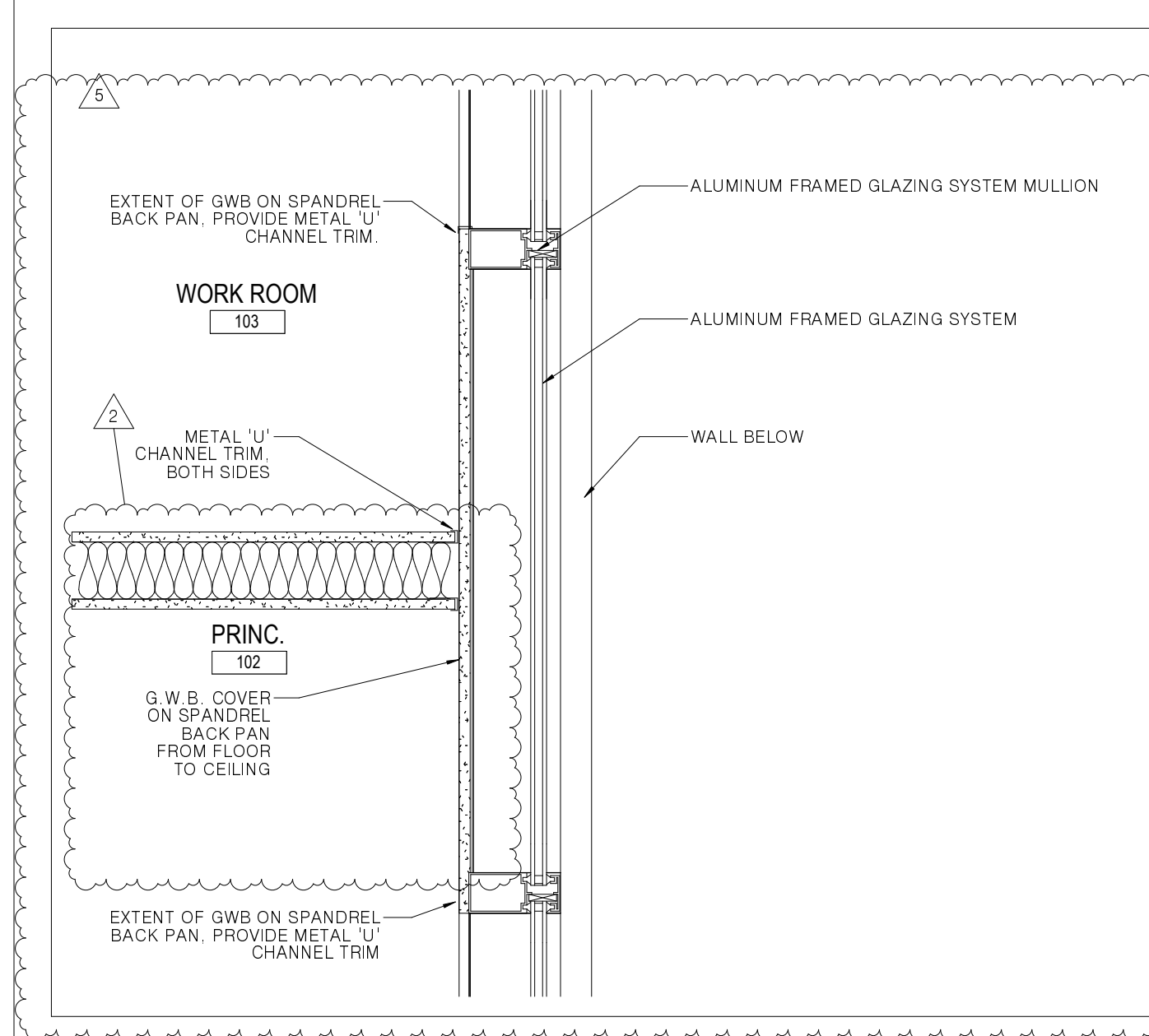




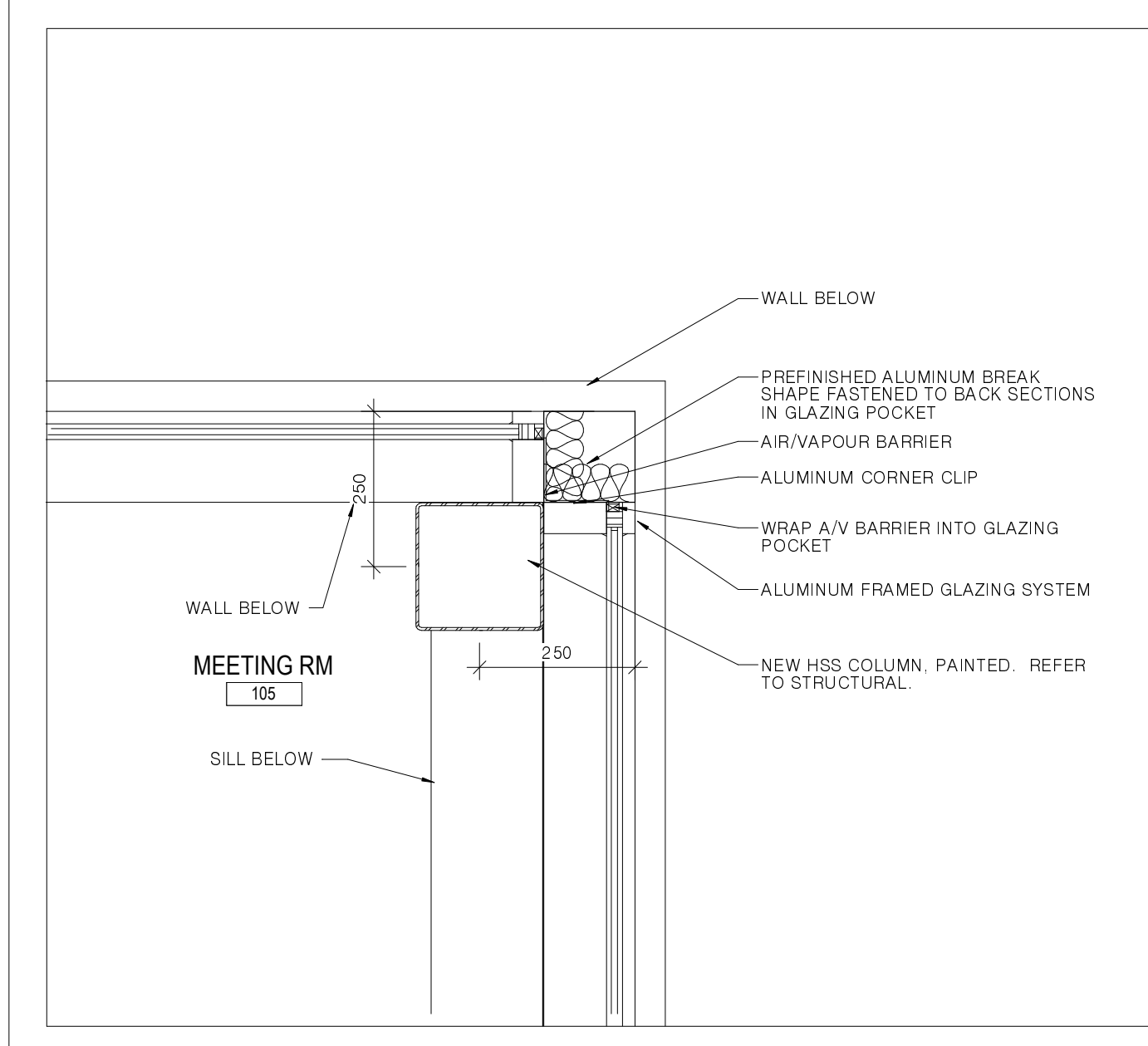
4 PLAN DETAIL SCALE 1:5



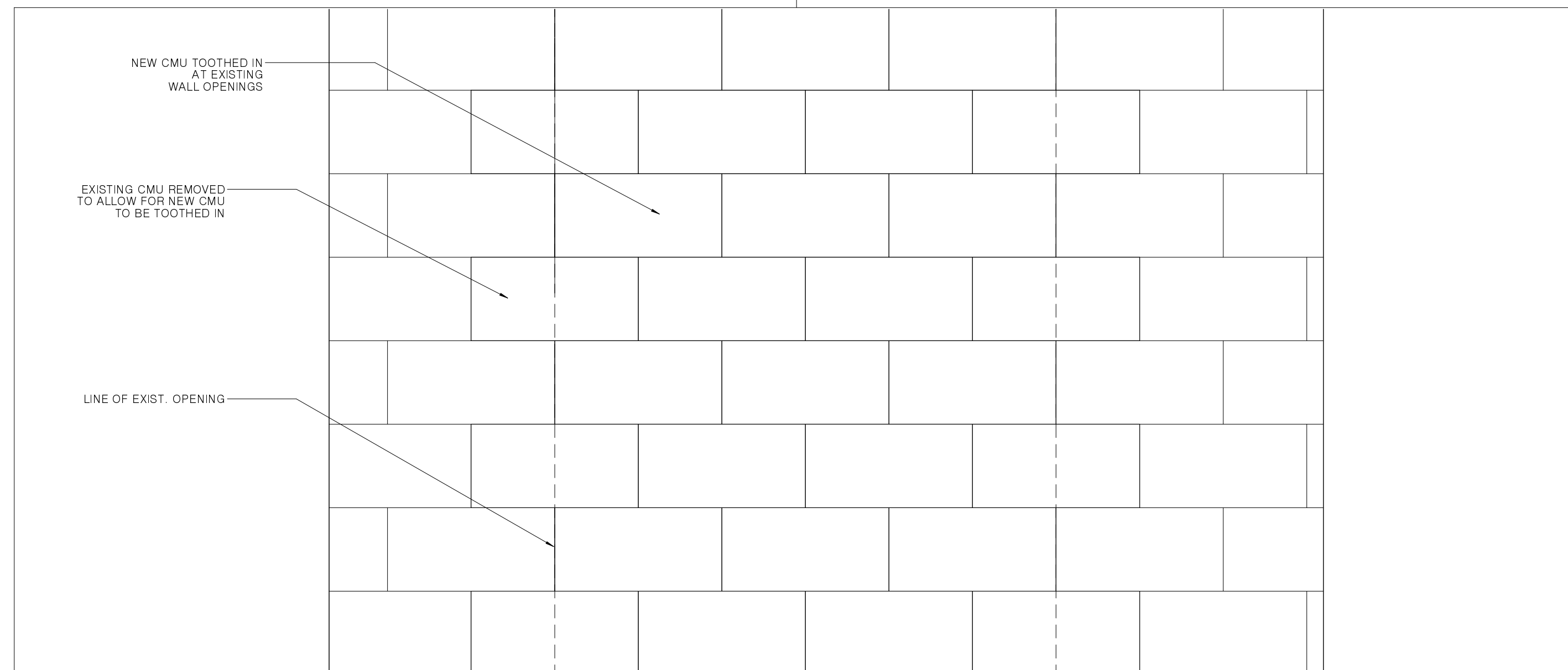
3 PLAN DETAIL SCALE 1:10



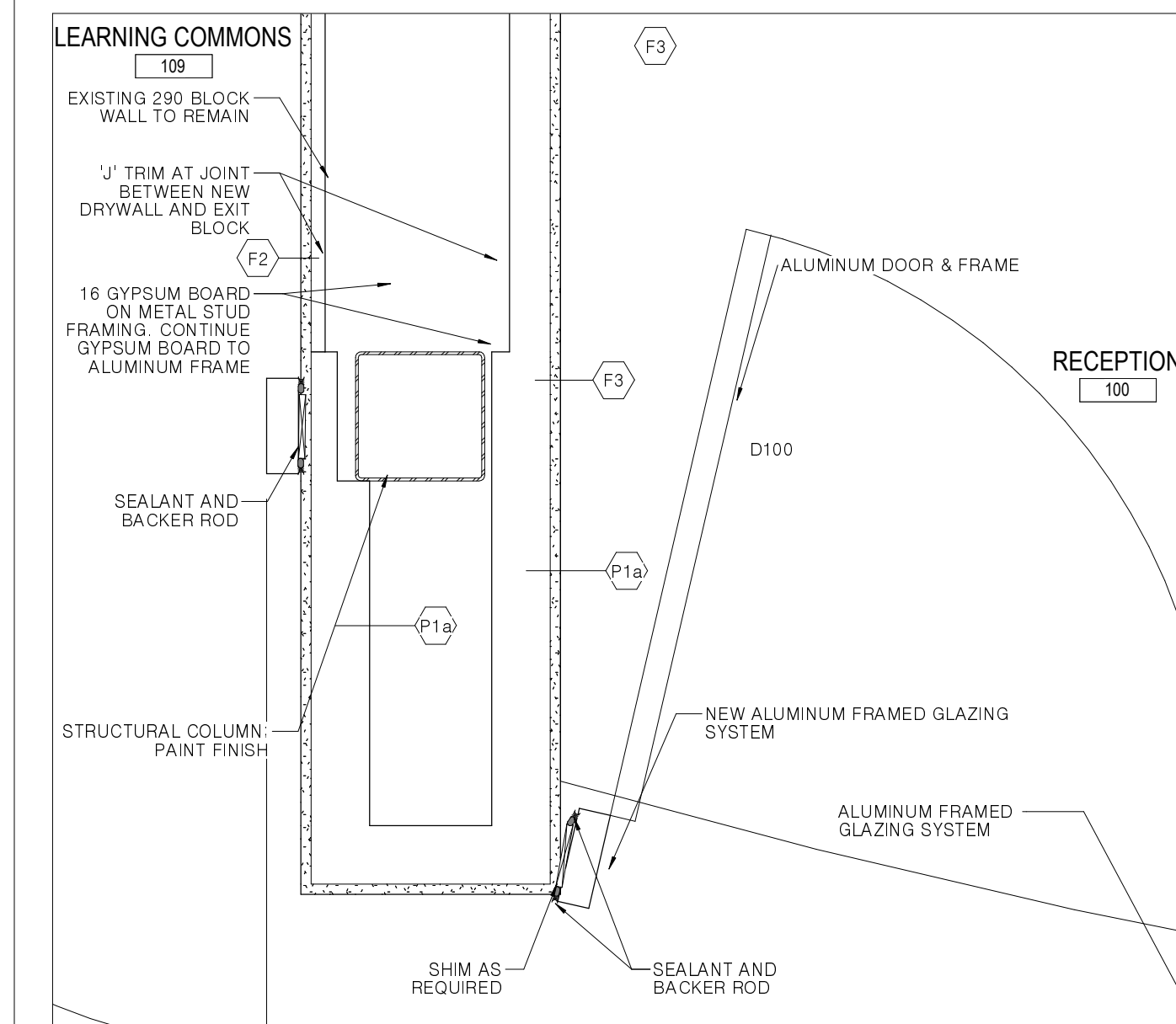
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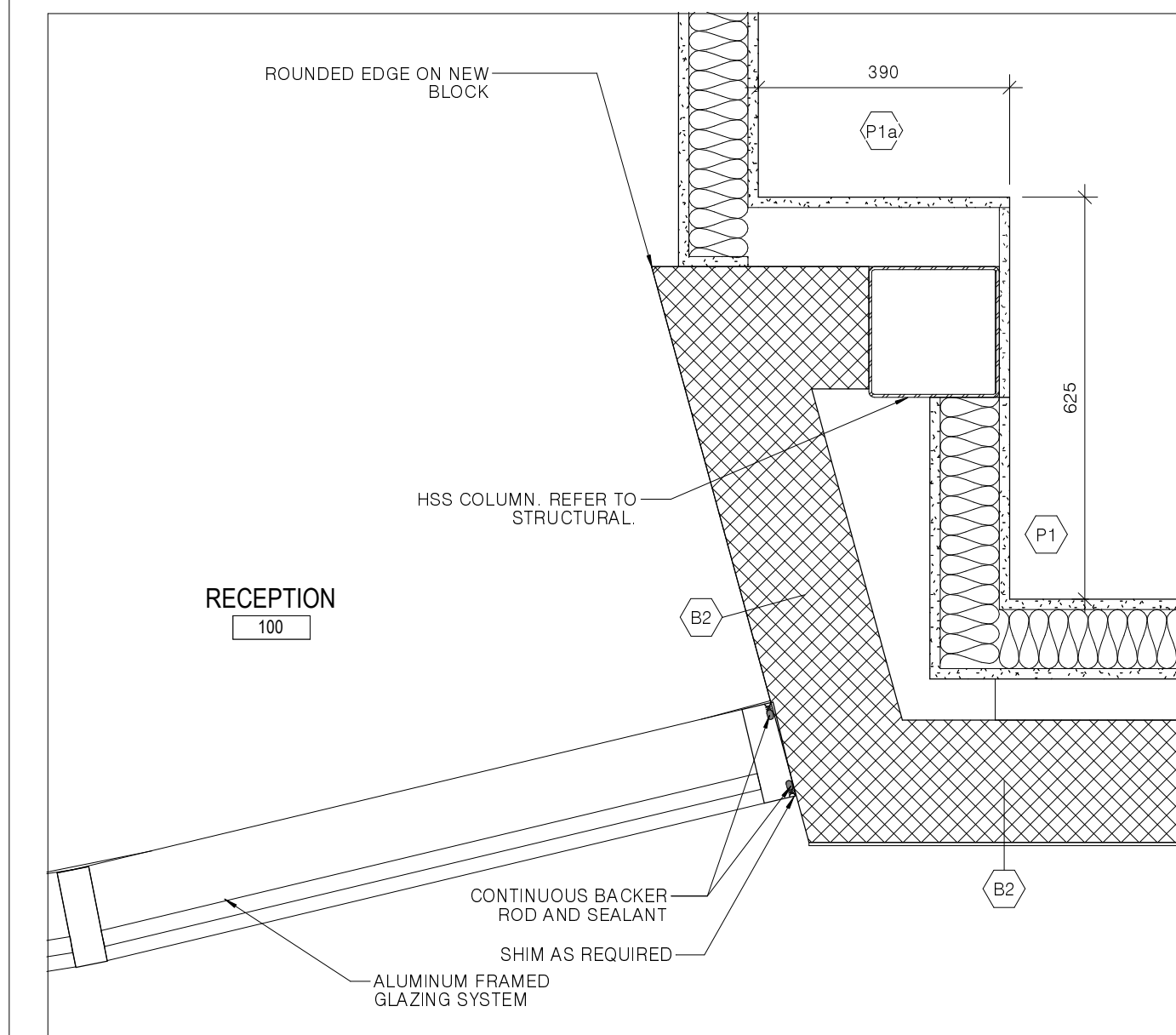
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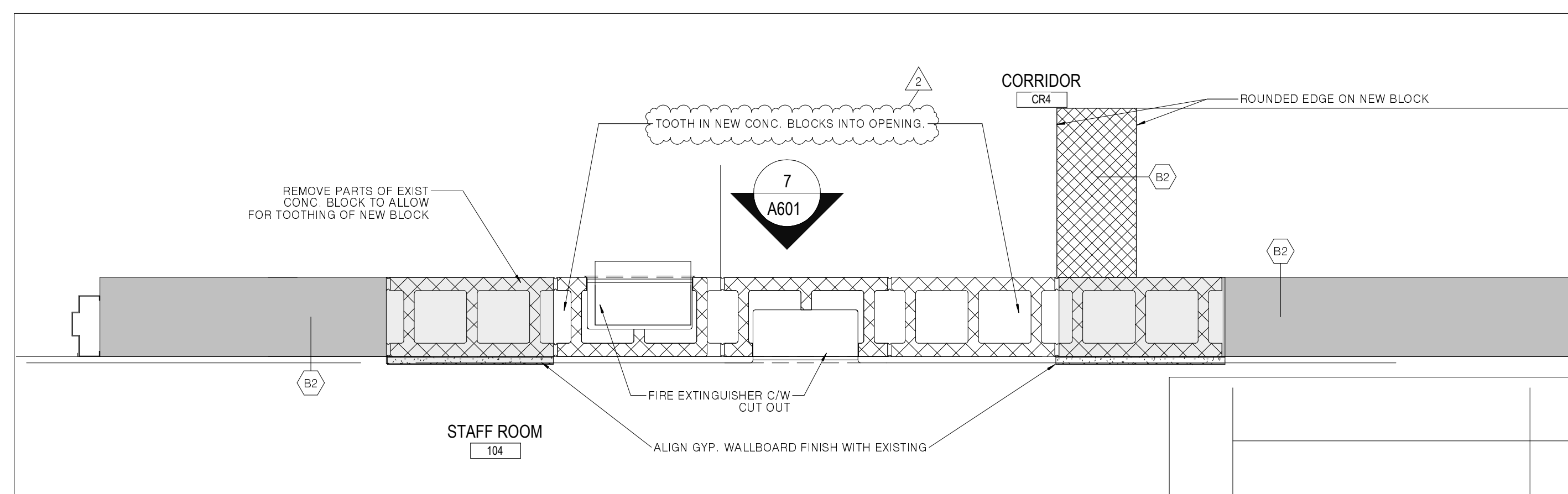
7 INTERIOR ELEVATION - BLOCK INFILL SCALE 1:10



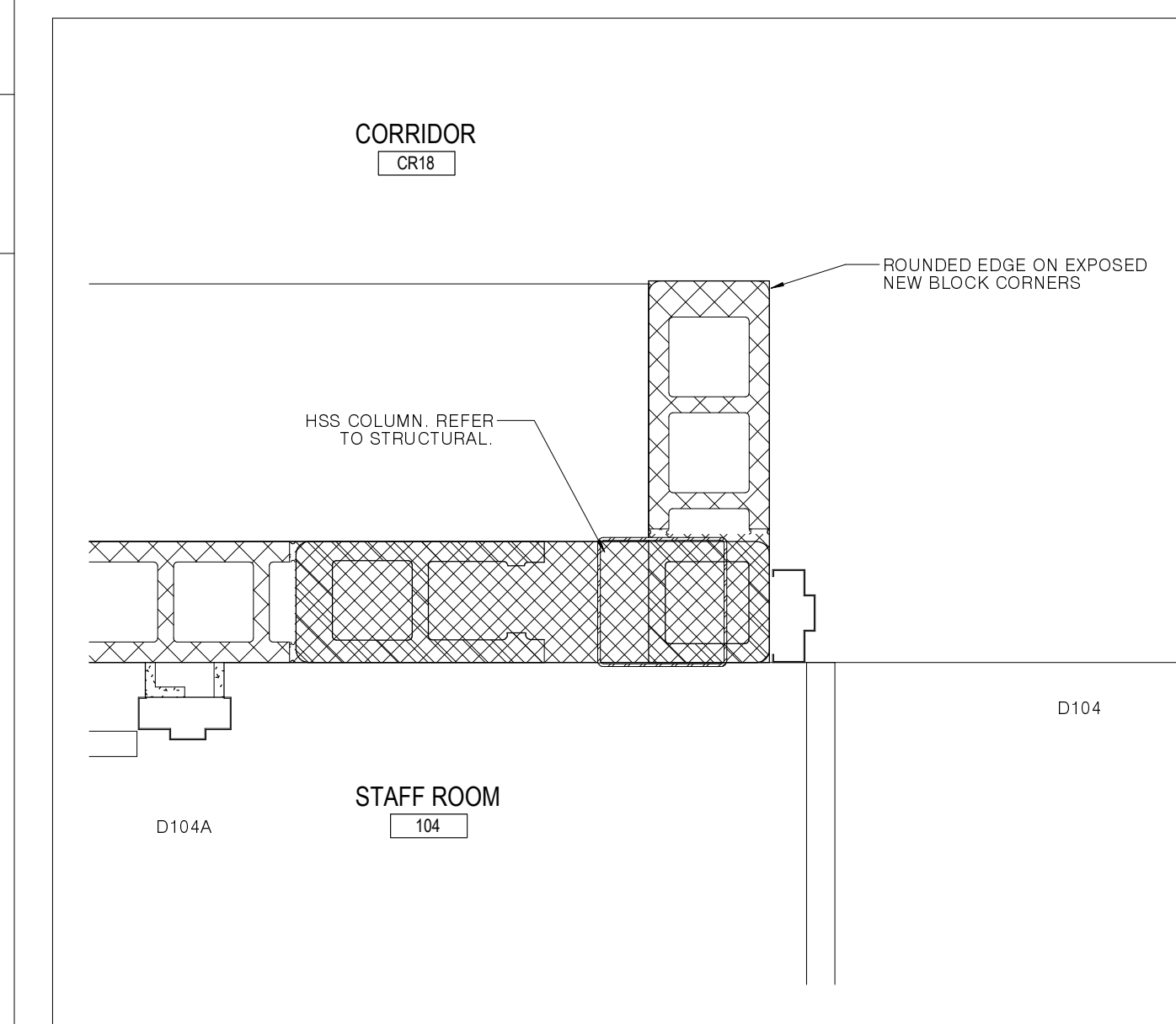
6 PLAN DETAIL SCALE 1:10



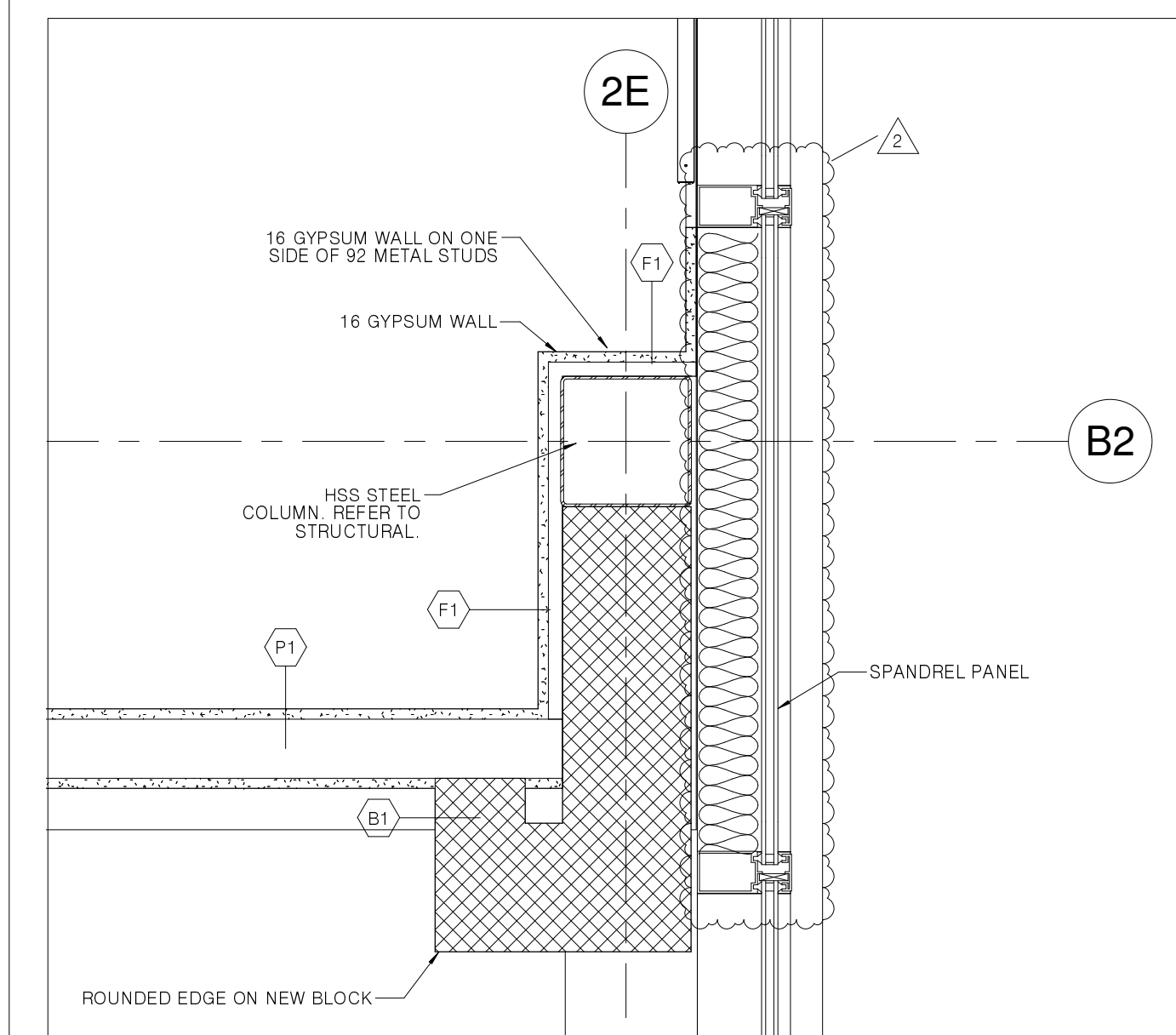
5 PLAN DETAIL SCALE 1:10



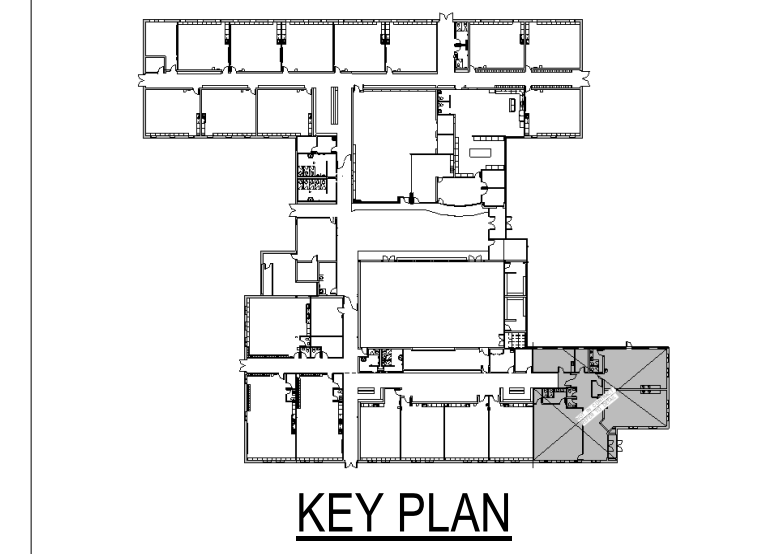
10 INTERIOR ELEVATION - BLOCK INFILL SCALE 1:10



9 PLAN DETAIL SCALE 1:10



8 PLAN DETAIL SCALE 1:10



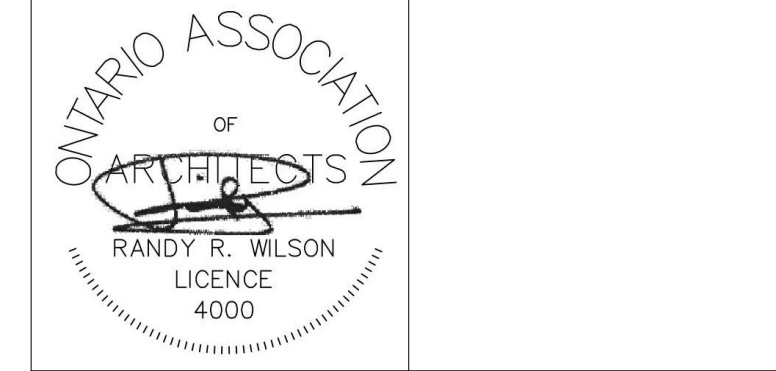
KEY PLAN

NOTES

LEGEND

NUMBER INDICATES ADDENDUM #

No.	DATE	DESCRIPTION	REV.
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2	05/03/2020	ADDENDUM 002	
1	19/02/2020	ISSUED FOR TENDER & PERMIT	

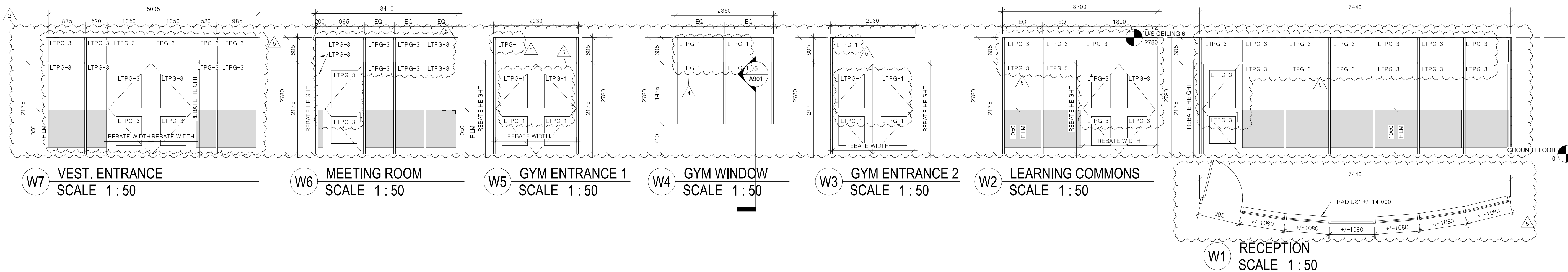
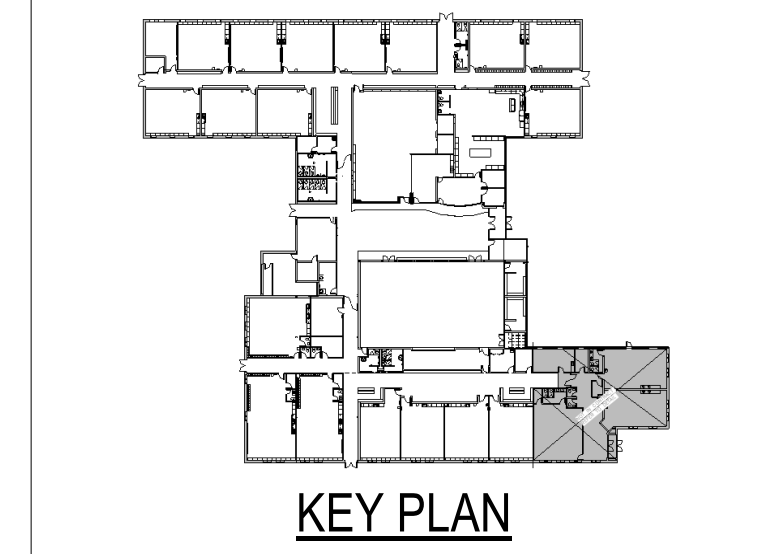


PROJECT TITLE  
**OUR LADY OF FATIMA - PHASE 4**

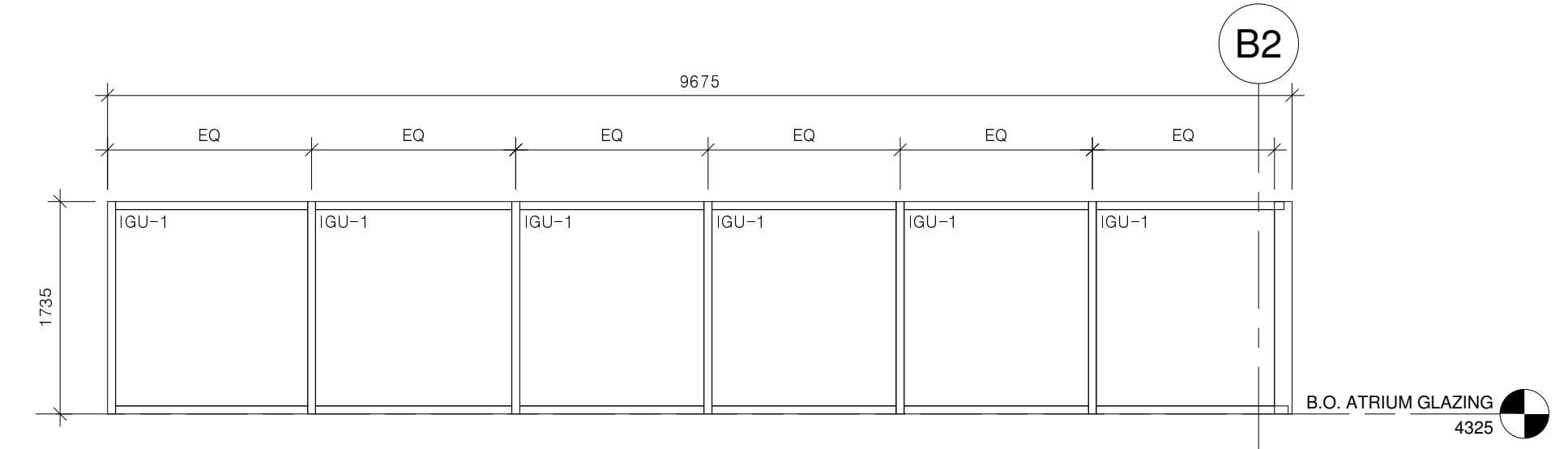
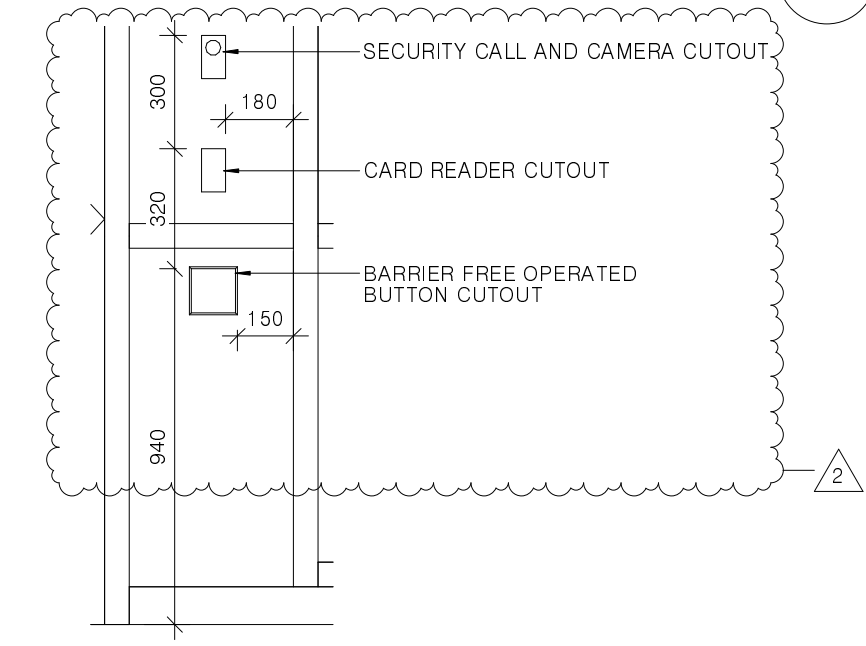
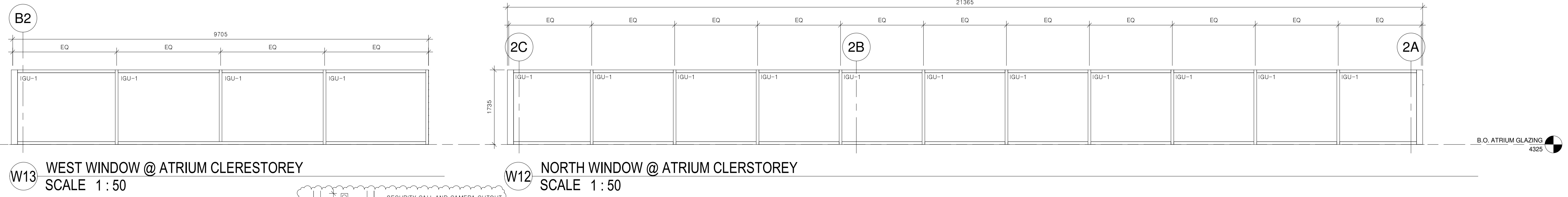
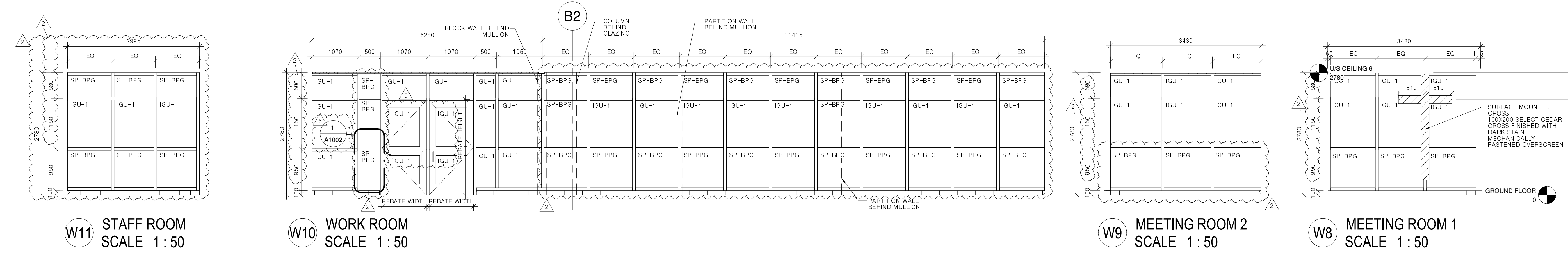
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**PLAN DETAILS**

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PROJECT No.		1901

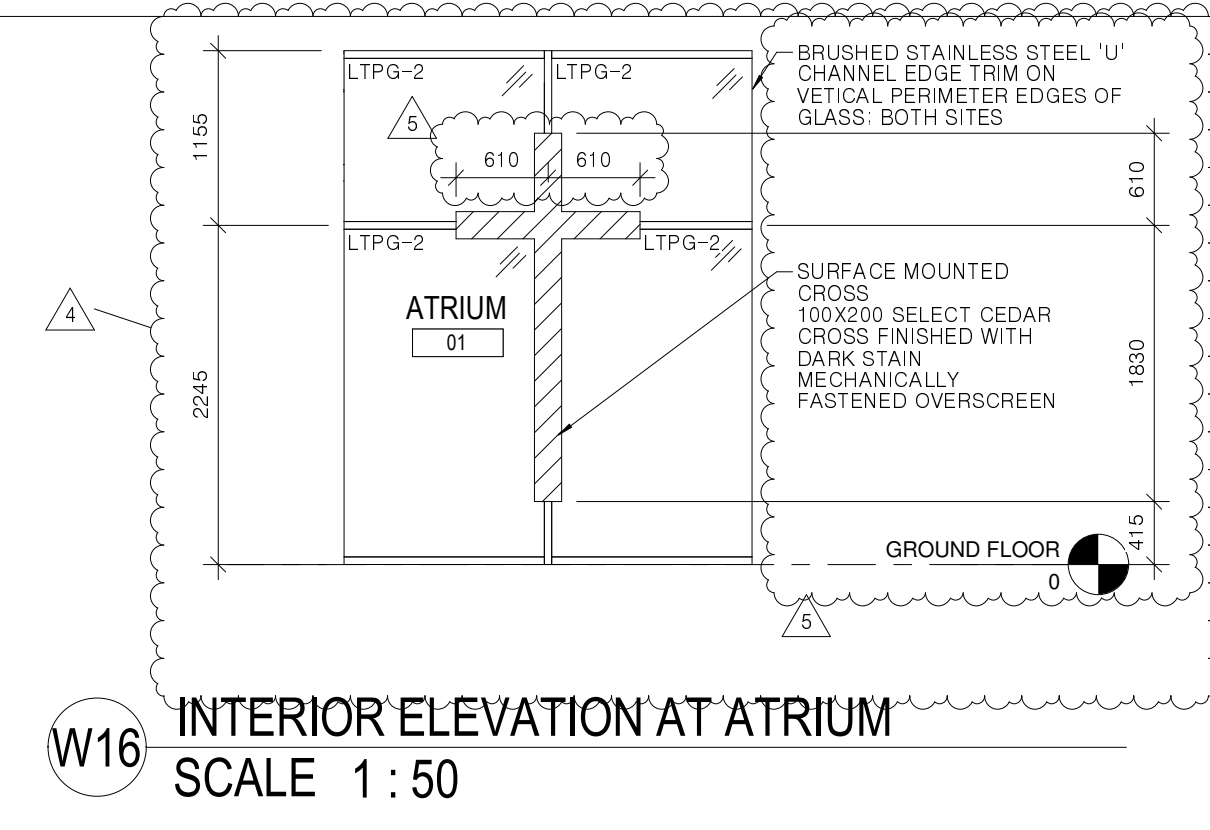




**INTERIOR ALUMINUM FRAMED CURTAIN WALL ELEVATIONS**



**EXTERIOR ALUMINUM FRAMED CURTAIN WALL ELEVATIONS**



**NOTES**

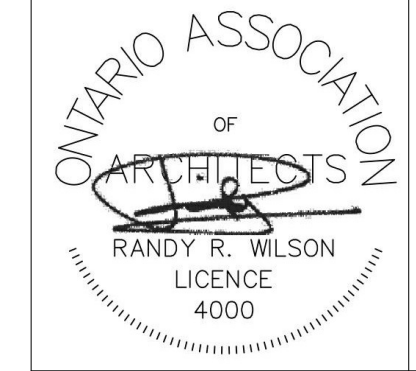
- SP - SPANDREL PANEL
- BPG - BACK PAINTED GLASS
- IGU - INSULATED GLASS UNIT
- LTPG-1 - LAMINATED TEMPERED PLATE GLASS (8MM PER PLATE AND 0.38mm INTER LAYER)
- LTPG-2 - LAMINATED TEMPERED PLATE GLASS (8MM PER PLATE AND 0.38mm FROSTED FILM INTER LAYER)
- LTPG-3 - LAMINATED TEMPERED PLATE GLASS (6MM PER PLATE - APPLIED FROSTED FILM WHERE INDICATED)
- SGIU TYPE C - 16MM HEAT TEMPERED SAFETY GLASS

**LEGEND**

- 5 04/30/2020 ADDENDUM 005
- 4 03/20/2020 ADDENDUM 004
- 3 30/03/2020 ADDENDUM 003 - NO DRAWING CHANGES
- 2 05/03/2020 ADDENDUM 002
- 1 19/02/2020 ISSUED FOR TENDER & PERMIT ADDENDUM 001

NUMBER INDICATES ADDENDUM #

No.	DATE	DESCRIPTION	REV. No.
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4	03/20/2020	ADDENDUM 004	▲
3	30/03/2020	ADDENDUM 003 - NO DRAWING CHANGES	▲
2	05/03/2020	ADDENDUM 002	▲
1	19/02/2020	ISSUED FOR TENDER & PERMIT	▲



PROJECT TITLE  
**OUR LADY OF FATIMA - PHASE 4**

DRAWING TITLE  
**GLAZING ELEVATIONS**

DATE PLOTTED 5/7/2020 11:03:33 AM	DRAWN BY RW	DRAWING No.
SCALE As indicated	CHECKED BY RRW	<b>A1002</b>
PROJECT No.		1901