EE Gabrielle-Roy

Specifications
Roof #1 Structure Replacement

Project Location:
14 Pembroke Street, Toronto ON

Prepared for:
Conseil scolaire Viamonde
116 Cornelius Parkway
Toronto, ON M6L 2K5

Prepared by:
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SPECIFICATIONS

DRAWINGS

APPENDICES

PART 1 GENERAL

Work under this contract is to replace the existing precast Reinforced Autoclaved Aerated Concrete (RAAC) roof deck and copper roof (Roof #1) as well as to perform building envelope restoration works at École élémentaire Gabrielle-Roy located at 14 Pembroke St. in Toronto, Ontario.

The purpose of this remediation work is to address deteriorating precast RAAC roof panels and copper roofing that are beyond their service life, provide a new roofing composition to meet current energy efficiency standards, and to repair/replace localized areas of spalling brick adjacent to the sloped roof area. Construction work is to be completed between the summer months of July and August 2025. Upon selection of the successful bidder, the School Board (Conseil scolaire Viamonde) will execute a contract.

The school is designated as a Part V heritage property by the City of Toronto. As such, a Heritage Permit has to be obtained by the Owner, in order to execute the work of this project. All other permits to complete the project are to be obtained by the Contractor through the provided Cash Allowances.

PART 2 SCOPE OF WORK – BASE BID

The work includes, but is not limited to, the following:

2.1 Item A: General Items

.1 **Mobilization/Demobilization:** Provide all labour, materials, and equipment necessary to undertake the work. Upon project completion, remove all materials and equipment and restore the site to original conditions.

.2 **Access:** Provide access as required to the attic roof structure as well as within the interior and exterior areas surrounding the building to facilitate the performance and inspection of the work described herein. This shall include all related equipment, safety supervision, engineering, etc. and the following:

- .1 **Removal and Reinstatement of Existing Fencing:** The temporary removal of the existing chain link fencing at the back (west) side of the school adjacent to the rear parking lot to accommodate crane access. The fence is to be reinstated upon completion of construction.
- .2 **Traffic Control Measures:** Appropriate traffic control measures are to be developed and implemented, as well as obtaining all required permits from the City, for crane access at the front (east) of the school on Pembroke Street.
- .3 **Interior Access:** There will be limited access to the attic space through the interior of the school for persons and small material/equipment. The Contractor will be responsible for interior protection of finishes and fixtures within the school where accessible. Otherwise, all materials and equipment shall be transported to the roof area from ground. The Contractor is responsible to provide hoist/scaffold/overhead protection as required to access area and transport materials.

.4 **Material Staging and Transportation:** The flat roof areas immediately adjacent to Roof #1 can be used as a staging area for materials that are transported from ground level. Materials stored on any roof area are to stay within designated live load limits of roof construction. Do not store materials on, or transport materials across, the roof areas without protection. Place plywood runways over existing roofing and completed work to enable movement of materials and other traffic. Any damage caused to existing and completed work at roof areas due to storage and transport of materials are to be repaired by the Contractor at their own expense.

.3 **Interior Construction Barrier:** Supply, install and maintain a suitable construction barrier to enclose the interior work area at all times and to protect against unauthorized access. The barrier is to be set-up in the interior corridor at the service entrance door to the attic on the top floor of the school. Door to the access the attic must be locked at all times and contractor to monitor its access. Provide secure framing and seal joints to mitigate the migration of dust into adjacent building spaces.

.4 **Exterior Construction Barrier:** Supply, install and maintain a portable modular fence around the exterior work area at all times, including to protect against unauthorized access. Provide temporary guard rails on the roof edge as required by the Ministry of Labour.

.5 **Traffic Flow:** Access for emergency routes, local traffic and parking must be maintained at all times. Supply, install and maintain signage, and flags-people as necessary to ensure smooth traffic flow through by the site.

.6 **Rigging:**

.1 Develop an engineered rigging plan to hoist the existing precast RAAC roof panels and to install the new steel roof decking as required by the technical sections herein, and as otherwise necessary to complete the work. Drawings shall be prepared by a professional engineer licensed to practice in the province and are to include set-up location, travel paths, timeframe, and calculations such as load weights, center of gravity, lifting points, sling angles, and required rigging components. Include for field review by the Design Engineer and submit written acceptance.

.2 Provide all necessary controls to prevent pedestrian and vehicular access through the area in which materials are being hoisted. Be responsible for repairing any damage to landscaping, concrete and asphalt pavements created by craning operations.

.7 **Grade Level Protection:** Provide overhead protection at all building entrances/exits and all emergency and service routes. Access to the building must be maintained at all times.

.8 **Interior Protection:**

.1 **General:**

.1 Maintain and protect all existing fixtures and finishes. The Contractor is to provide suitable forms of protection to prevent damage to existing interior wall, windows, doors, exterior walls, playground equipment, duct work, mechanical units and adjacent roof areas during the duration of the project.

.2 Provide a means of preventing dust and debris from entering the duct work throughout all areas of the attic.

.2 **Protection During RAAC Panel Removals:** The Contractor is responsible for preventing inclement weather from entering the interior if the building as part of the existing copper roof and RAAC panel removals. The Contractor shall conduct the following:

.1 Remove existing copper roofing and RAAC panels and install the new specified metal decking and gypsum board sheathing to the removed RAAC panel areas, to the amounts that can be completed within the same workday. As soon as the exterior sheathing board is installed to the metal decking and prior to each days end, the new roof deck assembly areas are to be made watertight by the installing the specified self-adhered vapour retarder membrane, in accordance to Section 07 26 13 Roofing Vapour Retarder and the following:

.1 Temporarily tie membrane into the remaining adjacent existing roof and/or wall construction to provide a watertight seal, until returning to site to continue RAAC panel removals, and new metal deck and gypsum sheathing board installation. Use manufacturer recommended sealants and/or mastics at membrane terminations.

.2 Once the membrane is installed and prior to leaving the site at days end, inspect the membrane for punctures, tears, fishmouths, and other deficiencies that will impact the performance of the membrane from stopping water from entering the building. Conduct necessary repairs in accordance with membrane manufacturer's requirements.

.3 **Protection During New Metal Panel Roof Installation:** During metal roof panel system installation, when roofing work cannot be completed in the same day or prior to anticipated precipitation, provide a temporary water cutoff between finished metal panel installations and the membrane installed to the roof deck substrate to prevent weather damage and water from entering the finished roof assembly.

.4 **Attic Protection:** Provide interior cantilevered scaffolding throughout the entire extents of the attic to prevent falling debris within the spaces below. The scaffolding is also to be used to provide safe access to the underside of the existing roof decking to facilitate the decking removals. The scaffolding design and review of its installation is to be conducted by a professional engineer. The scaffolding is to remain in place until it is no longer needed for the existing roof deck removals and new deck installations. The following shall be conducted to facilitate the scaffolding installation:

.1 Decommission and temporarily remove all necessary HVAC equipment within the attic space. This is to be coordinated with and reviewed by the Consultant.

.2 Recommission and reinstatement of all decommissioned and temporarily removed HVAC equipment. Coordinate and conduct recommissioning activities in accordance with the Consultant's requirements.

.9 **Preconstruction Deficiency Inspection:** Prior to bringing any material or equipment onto the site, inspect the landscaping, exterior components of the building, and interior spaces which will be accessed for damage, deterioration, excessive wear or soiling. Submit a photographic or video log of the observed deficiencies to the Consultant and Owner. Accept responsibility for any items not identified which require repair, painting or cleaning upon completion of the work.

.10 **Project Supervision:** Provide a Project Supervisor, to be present at the job at all times that Work is being performed, for the duration of the project. The Supervisor is to have full knowledge of the Scope of Work and be able to direct forces accordingly. The Supervisor shall be of the Contractor's own forces and shall not be a representative of a Subcontractor. Superintendence shall be competent and satisfactory to the Owner and Consultant. Superintendence shall be deemed unsatisfactory and changes or additions to superintendence can be demanded by the Owner or Consultant when control, organization, or coordination of the Work is not adequate, quality of the Work does not meet Contract Document requirements, directions given in accordance with Contract Documents are not followed, or progress is behind schedule.

.11 **Bonding:** Arrange for and obtain all necessary bonds in accordance with the Contract documents.

.12 **All Other Items:** Costs for items that are not specifically itemized and described below but are required to complete the work in accordance with the Drawings and/or Specifications, and whose quantities can be pre-determined, are to be included under "All Other Items".

2.2 Item B: Removal of Existing Roof # 1 Structure and Roofing Assembly

.1 Supply all equipment, materials and labour to execute the Removal and Disposal of the existing precast RAAC roof deck, roofing assembly, and building envelope materials within the designated work area as per the terms, conditions, drawings and specifications contained in this Request for Quotation document.

.2 Prior to executing the work, a qualified contractor is to review the Designated Substance Survey report. There are designated hazardous substances present within the working area. Contractor to supply all equipment, materials and labour for the **Abatement of Designated Substances and Hazardous Materials** in accordance with the terms, conditions, drawings and specifications received by the abatement contractor and the Consultant. Refer to **Appendix A and B** for further information.

.3 Removal of Existing Equipment at Underside of Existing Roof Deck:
- .1 Prior to removals, label and provide written record of each existing component attached to the underside of the roof deck for later reinstatement of items that are to be salvaged.
- .2 Remove and dispose of the existing light fixtures attached to the underside of the roof structure above the attic. Wiring and conduits servicing these fixtures are to be salvaged.

.3 Temporarily remove, store, and salvage all heat detectors and conduits attached to the underside of the roof deck to accommodate the replacement work. Note that all power within the attic space is to be temporarily shut off for the duration of work and reinstated upon completion. Inform the local fire authorities that a portion of the building will be offline from the fire detection system for the duration of construction.

.4 Temporary disconnect and remove the existing conduit, ductwork, exhaust fans and vents connected to the existing roof precast panels and roofing assembly. Coordinate any required shutdown with the Owner to minimize impact on building operations.

.5 Remove existing eavestroughs and downspouts attached to the existing roof structure to be replaced as shown on the Project Drawings and dispose of off-site.

.4 Removal of Existing Roofing Assembly and Roof Deck:

.1 Remove and dispose of the existing roof assembly, 3 1/2" precast RAAC roof panels, copper roof and metal flashings in the areas shown on the Project Drawings. Based on available information, the existing assembly is as follows, from top to bottom:

.1 Copper roofing with membrane coating.

.2 3 ½" precast RAAC roof panels on riveted steel roof trusses.

.2 Based on available information, the following are the existing connections of the existing roofing system (refer to **Appendix C** for existing reference drawings):

.1 The copper roofing is anchored to the RAAC roof panels via metal rods, through the battens of the copper roof and to the underside of the existing panels.

.2 The existing panels are anchored to the existing steel purlins via intermittent 20-guage, 2" wide, galvanized metal clips. The clips are anchored to the top side of the panels by 2-1/2" long galvanized nails, with grout between panel joints over purlin locations.

2.3 Item C: Installation of New Roof Structure and Roofing Assembly

.1 Supply all equipment, materials and labour for the installation of the new roof metal deck and assembly within the designated work area as per the terms, conditions, drawings and specifications contained in this Request for Quotation document.

.2 Clean all existing steel structure free from rust and touch up rusted areas with corrosion resistant paint prior to installation of metal deck.

.3 Install new 1.5" deep metal deck over existing (cleaned) roof steel trusses. Fasten new deck to the existing roof trusses at all bearing points with powder-actuated mechanical fasteners in accordance with manufacturer's instructions.

.4 Inspect all surfaces of deck after erection and touch-up with zinc-rich paint where protective coating has been scratched or damaged.

.5 Cut openings in roof deck for facilitating the reinstallation of the previously removed exhaust fans and vents at the locations shown on the Drawings. Notify Consultant and Owner for review and approval of fan locations. Reinforce the openings as required by the technical specifications.

.6 Install a new roofing assembly on the existing roof framing steel with the following components to achieve specified warranties, from bottom to top:
- .1 1.5” deep Vicwest metal roof deck.
- .2 0.5” glass-mat faced gypsum sheathing panel, adhered.
- .3 Vapour retarder roof membrane.
- .4 3.5” Rockwool insulation.
- .5 Standing seam (batten seam) roof panels (match existing copper green patina).

.7 Install new sheet metal flashings along the roof perimeter including counter flashings at the east and west end walls.

.8 Re-instate all previously removed conduits and heat detectors, fastened to the underside of the new roof deck.

.9 Supply and install new eavestroughs and downspouts at the previously removed locations in accordance with the manufacturer’s instructions. Eavestroughs shall be prefinished galvanized sheet metal see Section 07 62 00 (colour and profile to match existing). Downspouts shall consist of 100mm x 75mm prefinished galvanized sheet metal (colour and profile to match existing).

2.4 Item D: Localized Masonry Repairs:

.1 Replace and repoint all deteriorated and loose concrete masonry units and mortar and re-caulk control joints, at the upper level of the adjacent exterior brick walls on the east and west sides of the roof area as shown on the Drawings. All work is to be completed in accordance with the technical specification and Drawings herein. Contractor to remove temporarily items attached to the walls (i.e. lighting, conduit, banners) as required to facilitate the repair work. Note that the use of scaffolding may be required to access the repair locations.

.2 Localized Brick Repair:
- .1 Review the exterior brick walls and identify all deteriorated bricks for review with the Consultant.
- .2 Once receiving instructions from the Consultant to proceed, remove and replace loose, spalled, cracked or otherwise deteriorated brick units, taking care not to damage adjacent brick units.
- .3 Remove all mortar and dust from adjacent surfaces prior to laying new brick.
- .4 Install new brick to match the existing for size, texture, colour, and coursing.

.3 Localized Mortar Joint Repair:
- .1 Review the exterior brick walls and identify all deteriorated mortar joints for review with the Consultant.
- .2 Once receiving instructions from the Consultant to proceed, rout out loose, spalled, cracked or otherwise deteriorated mortar joints, and strike edges of removals flush with a chisel, taking care not to damage adjacent brick units;

.3 Remove all mortar and dust from adjacent surfaces prior to installing new mortar.
.4 Re-point joints with a colour matched mortar and mortar suitable for adjacent material. Joint profile to match existing.

2.5 Item E: Interior Clean-Up:

.1 Clean all dust and debris on interior surfaces, including but not limited interior wall and floor finishes, equipment, etc. that was generated from the Construction, upon completion of the Work.

.2 Have all mechanical duct work, interior and exterior sides, within the area of Work professionally cleaned upon the completion of the Work, in accordance to Section 23 01 30.51 HVAC Air Distribution System Protection and Cleaning.

2.6 Item F: Cash and Contingency Allowances

.1 **Cash Allowance for Permits and Testing:** Arrange and pay for permits as outlined with the technical sections of this specification. Arrange for third party testing as outlined in the specifications.

.2 **Contingency Allowance for Miscellaneous Repairs:** Contingency allowance to cover repairs to unforeseen or concealed conditions found during construction. Work under this item is only to be completed under direction of the Consultant in writing.

PART 3 SCOPE OF WORK – OPTIONAL ITEMS

3.1 Item O1: Supply and install copper sheet metal roofing in lieu of steel panel roofing

.1 Install copper sheet metal roofing panels as opposed to steel panels in accordance with Section 07 61 00 Sheet Metal Roofing – Copper and 07 62 15 – Copper Flashing and Trim. Price to include the difference (either additional or credit) in material and labour cost for only the change to copper. All other components of the new roofing system are as specified. Refer to Appendix B4, Alternative Price(s) in the front end document.

3.2 Item O2: Supply and install copper metal eavestroughs and downpipes in lieu of galvanized sheet metal

.1 Install copper metal eavestroughs and downpipes in lieu of prefinished galvanized sheet metal see Section 07 62 15. Price to include the difference (either additional or credit) in material and labour cost for only the change to copper. Refer to Appendix B4, alternate Price(s) in front-end document.

END OF SECTION

PART 1 GENERAL

1.1 General

.1 Accept instructions only from the Consultant and sources designated by the Consultant.

.2 The building shall remain in use in areas not immediately affected by the work. Ensure that normal building operations and maintenance may be carried out without disruption, except as otherwise noted herein or stated in the Bid.

.3 Work shall be allowed only from 8 a.m. to 6 p.m., Monday to Friday. The work shall be performed according to the start date and duration given in the Bid Document.

1.2 Protection of Work, Property and Persons

.1 Supply, install and maintain a portable chain link fence construction barrier around work area.

.2 Maintain all emergency and service access routes clear at all times. Provide barricades and signs necessary to direct vehicular and pedestrian traffic around construction areas.

.3 Before commencing work, identify all paths for dust, fumes or odours generated by the work to penetrate interior spaces. These shall include make-up air intakes, ventilation/exhaust openings for service rooms such as generator or hydro vault rooms, doors, windows, and pipe or cable penetrations. Take measures such as enclosing, or sealing the openings to prevent dust, fume or odour ingress. If required, coordinate temporary shut-down of mechanical equipment by Owner.

.4 The Contractor is responsible for damage caused or clean-up required by dispersion of dust generated by the work.

.5 Before commencing work, inspect all building components, including drains, lights, signage, windows, screens, doors, etc. within or adjacent to the area of the work. Submit a photographic record of existing damages on CD to the Owner & Consultant. Catalogue existing conditions at landscaping, plantings and pavements as well.

.6 Receive, be responsible for, and promptly arrange all details of compensation for all damage existing after the work which was not recorded prior to the work. Unless dealt with promptly by the Contractor, the Contractor will be responsible for costs for time of Owner's or Consultant's personnel and other costs incurred for claims not handled by the Contractor. This includes costs for correction of deficiencies paid for by the Owner.

.7 The Contractor shall assume all responsibility for any damage resulting from the use of the building’s drainage system to dispose of construction water irrespective of the drain system condition.

.8 For work requiring interior building access, ensure no combustible materials (e.g. cardboard, wood, plastic, other debris) are placed or stored in elevator shafts, ventilation shafts or means of egress including hallways and stairwells.

.9 Ensure the building envelope affected by the work is made water-tight prior to adverse weather, and at the end of each day, to prevent interior leakage.

1.3 Project Schedule

.1 Monitor compliance with the contract schedule on a daily basis.

.2 If unit price items increase by more than 30%, or should unusual weather or other unforeseen conditions affect the project schedule, submit a revised schedule for owner approval to reflect.

.3 Provide a work force that is equal to or exceeds the crew size provided in The Bid Documents. If the Owner or Consultant, at any time, considers the number of workers, equipment or materials to be insufficient to maintain the Contract schedule, the Owner, through the Consultant, may, in writing, order the Contractor to work weekends/and or additional hours or provide additional workers, equipment, or materials as the Owner and Consultant may think necessary at no additional cost to the Owner in order that the Work be performed according to the terms of the Contract Schedule. Should the Contractor fail to comply with the order, the Contractor shall be considered to be in default of the Contract.

.4 Should the Contractor fail to meet the project schedule as a result of conditions under their control, the Owner reserves the right to deduct costs for additional time required by the Consultant from amounts owed to the Contractor.

.5 Where temperature sensitive work must take place and environmental conditions are not likely to be within the specified limits, and where it is not feasible to provide heat (as agreed to by the Contractor and Consultant), and where the Manufacturer has provided the Contractor with approval to proceed with the work, proceed only with written authorization from the Consultant. At least five days before the work is to take place, submit Manufacturer’s written instructions to the Consultant. The Manufacturer’s written instructions must include the revised environmental condition limits, details of required modifications to products or application procedures, and risks associated with proceeding under the revised conditions. The Consultant is not obliged to authorize the change.

1.4 Project Supervision

.1 Ensure that a qualified supervisor and foreman, capable of communicating effectively in the English language, familiar with the requirements of these specifications, is on site at all times, including during subcontractors’ activities.

.2 Control all aspects of the Work to minimize interference of occupants' use of the building. Be responsible for workers' activities while on the site. No smoking or horseplay will be permitted on site.

.3 Conform to all By-Laws and all Legislated requirements including those related to labour, noise and the environment.

.4 Maintain the latest versions of the following documents on site:
- .1 Contract drawings and specifications;
- .2 Site Visit Reports issued by Consultant;
- .3 Additional Drawings issued by Consultant;
- .4 Contemplated Change Orders and Change Orders;
- .5 Material Test Reports;
- .6 Accurate daily records of all work performed, weather and labour force;
- .7 Manufacturer's specifications for all products to be used;
- .8 Proof of WHMIS training for all site personnel;
- .9 Product data sheets to meet the WHMIS requirements;
- .10 Occupational Health and Safety Act and Site Specific Safety Plan;
- .11 Shoring/ Scaffolding Design;
- .12 Working at Heights Certificates;
- .13 Suspended Access Rigging Plan;
- .14 Emergency Contact;
- .15 Building Permit; and,
- .16 Notice of Project.

.5 The Contractor is entirely responsible for site safety. No actions or lack of action by the Owner or Consultant shall be deemed to be an instruction related to safety of the workplace.

.6 Drawings are diagrammatic and are intended to convey the scope of work and indicate general and approximate locations and arrangement of work. The Contractor shall obtain accurate information about locations, arrangements and dimensions from the site.

.7 When site conditions differ from the drawings, obtain the Consultant's approval in writing prior to deviating from the drawings. The Consultants shall issue a formal site instruction or detail on a site report.

1.5 Applicable Laws, Regulations and Standards

.1 Perform all work in accordance with current Code requirements and local and municipal by-laws.

.2 All Standards referred to shall be the current editions as amended at the date of issue of Contract Documents.

.3 The Contractor is responsible for obtaining and paying for all building permits, street permits, power line protection, damage deposits, etc., as required.

.4 The Contractor is responsible for notifying the proper municipal inspector in advance (as specified by the inspector) to complete review of any project component the local municipal authority requires. Ensuring that correct municipal reviews are completed shall be solely the Contractor's responsibility. Additional work to expose or re-do uninspected work shall be completed by the Contractor at their expense.

1.6 Substitutions

.1 Any requests for substitutions to materials and/or installations specified and/or stated in the bid documents must be submitted to the Consultant, at least ten working days prior to the intended application.

.2 Submit information regarding the proposed substitution, including manufacturer data sheets, independent test reports, performance differences compared with the specifications, and the amount of credit offered.

1.7 Project Meetings

.1 At least one week prior to start of work, attend a meeting between the Consultant, the Owner and /or Owner’s representative and the Contractor's Project Manager to discuss the work.

.2 Attend by-weekly site meetings with the Consultant, the Owner and /or Owner’s representative at a mutually agreeable time for the discussion of progress of the work and to resolve any difficulties.

1.8 Quality Assurance

.1 Make all measurements required to perform the work. Determine site dimensions and levels so that all new work is installed to correct sizes.

.2 Protect all completed and approved work from damage. Make good any damages caused to completed work.

.3 Maintain all work completed or in progress in its condition as accepted.

.4 All work shall meet or exceed the more stringent of the manufacturer's requirements or the requirements of this Specification.

1.9 Construction Review and Testing

.1 The Contractor shall notify the Consultant and inspection and testing agents not less than 48 hours prior to each part of work being ready for review or testing. Work which requires review or testing shall not be performed on weekends or holidays unless previously agreed to.

.2 The Contractor shall be responsible for payment of costs if the work is not ready when stated and if the Consultant and inspection and testing agency are not given sufficient notice of such delay.

.3 The Owner reserves the right to deduct from the Contractor amounts for extra inspection and testing by the Consultant as required for certification of payment of work done to repair a deficiency.

1.10 Temporary Facilities

.1 Provide a means of direct communication with the site to permit continuous contact on a daily basis.

.2 Provide temporary sanitary facilities and maintain in a sanitary condition. Site facilities shall not be used by the Contractor's forces.

.3 Temporary electrical power for hand held equipment will be provided free of charge by the Owner. Arrange and pay for any usage and connection costs required for all other equipment. Do not connect to the building's power supply without written permission of building management.

.4 The existing water supply from existing hose bibs at the site may be used free of charge. Any water required in excess of this supply shall be metered and paid for by the Contractor. Be responsible for connecting to the existing services. Do not use fire system without written permission of building management. Advise Building Operations/Property Management of any procedures that may cause fire alarms to activate.

1.11 Materials and Equipment

.1 Deliver all materials to the site in their original unopened containers, with labels intact. Where applicable, check material expiry dates. Immediately dispose of all materials older than their expiration date away from the site.

.2 Store all materials and equipment in accordance with manufacturer’s written requirements, and in a dry, secure and protected manner which will not overload the structure and shall prevent vandalism or unauthorized use. Storage locations shall be approved in advance by the Owner.

.3 Be responsible for the security of all materials and equipment. Stolen or damaged goods are solely the Contractor’s responsibility.

.4 Non-specified materials shall not be brought to site. Remove any non-specified materials from site within 24 hours upon request by the Consultant.

1.12 Waste Management

.1 Material and debris resulting from the Construction shall be disposed of offsite in a timely manner. Storage locations shall be approved in advance by the Owner. Material or waste storage on structural slabs must be approved by the Consultant.

1.13 Project Closeout

.1 Flush clear all drains affected by the work.

.2 Clean site of all materials and debris created by the Construction. Remove all caulking, paints, cementitious material or the like from windows. Damaged or scratched windows must be replaced at the Contractor’s cost.

.3 Submit written acceptance that utility companies have inspected services to their satisfaction.

.4 Provide Consultant with all Warranty and Bond Certificates with:
- .1 The proper name and address of the Owner and of the Project.
- .2 The date the warranty commences, which corresponds to the date of Substantial Completion.
- .3 A clear statement of what is being warranted as referenced in the Specifications.
- .4 The signature and seal of the company issuing the warranty, countersigned by the Contractor.

.5 Attend a final walk-through with the Owner and Consultant. The Consultant will record identified incomplete and deficient work for distribution to the Contractor and Owner.

.6 Make good all known deficiencies in the work in a timely manner, but no later than 1 week.

.7 Notify Consultant of readiness for final inspection only after completion of these items.

.8 The Consultant will review completion the identified deficiencies during one review. Additional reviews required to check un-rectified deficiencies or work that remains incomplete will be charged back to the Contractor. These charges will be deducted by the Owner from the Contractor's progress payments and paid from those funds to the Consultant.

1.14 Emergencies

.1 In an emergency affecting or threatening the safety of life, the work or adjoining property, the Owner and Consultant have authority to stop the progress of the work.

.2 Provide the Owner and Consultant with the name and telephone number of a person that is available and may be contacted during off hours, weekends and holidays in case of emergency.

1.15 Cash Allowances

.1 Expend cash allowances only on written instructions from the Consultant. Use only Testing Agencies approved by Consultant.

.2 Include in each expenditure from cash allowances applicable taxes as specified in the General Conditions of the Contract.

.3 Payment shall be made only for actual charges and only at the rate for work performed during normal business hours. No overhead or profit for the Contractor will be included in these amounts. Charges for stand by time or non-productive visits caused by the Contractor or the Contractors' forces will be the Contractors' responsibility.

.4 Cash allowances for permits shall be used only for the cost of the permit. All other costs associated with obtaining any permit shall be included elsewhere.

END OF SECTION

PART 1 SUBMISSION REQUIREMENTS

1.1 Purpose

This section is to be read in conjunction with, and supplement procedures for submittals as outlined in CCDC-2 conditions, Supplementary Conditions to the Stipulated Price Contract (CCDC 2 – 2020), and Specification Section 01 00 00 – General Conditions.

1.2 Acceptable Forms

.1 Acceptable forms of submission are hard copy delivered to the Consultant's address or electronic transmission to the Consultant in .pdf format.
  .1 Electronic submissions exceeding 10 Megabytes in size require coordination for delivery to the Consultant via email.

1.3 Transmittal

.1 Each submission by the Contractor shall be accompanied by a transmittal sheet. The transmittal sheet shall include:
  .1 Name and address of project prominently displayed;
  .2 Name of Contractor, Owner, and Consultant;
  .3 Date of submission; and
  .4 Itemized list of the contents of the submission, including relevant specification section for each item and number of pages or samples associated with each item.

1.4 Product Data

.1 Manufacturer's product data sheets and material safety data sheets shall be submitted for all products being used in the completion of the work.

1.5 Samples

.1 Each sample provided by the Contractor shall be an accurate representation of the work to be completed. They shall be prepared using the same tools to be used in completion of the work.

.2 Samples submitted for colour selection or texture only shall be noted as such on the submission transmittal.

.3 The Consultant will retain sample submissions until completion of the work.

.4 Where colour or texture samples are submitted the manufacturer's name, product name and colour or texture shall be clearly indicated on the sample.

1.6 Shop Drawings

.1 Shop drawings shall be reviewed by the Contractor for general conformance to specifications prior to submission to the Consultant. The Contractor shall affix a company stamp to the drawings indicating their review.

.2 Drawings to clearly indicate dimensions in metric scale.

.3 Drawings shall clearly detail all anchor points, connections, transitions, and methods of attachment.

.4 Drawings requiring design by a Professional Engineer, including but not limited to metal deck and scaffolding design, shall be signed and sealed by a Professional Engineer licensed to practice in the province of Ontario.

1.7 Others

.1 Any other submittal not fitting a category called out above (ex. Letter from a manufacturer, etc.) shall be subject to the same submission requirements as outlined in this document.

PART 2 GENERAL SUBMISSIONS

2.1 Required Submissions

.1 Prior to commencement of any work the Contractor shall submit to the Consultant the following:
- .1 Detailed project schedule, showing key milestones and contingency days;
- .2 Notice of Project;
- .3 WSIB Clearance;
- .4 Insurance Certificates (with Conseil scolaire Viamonde and MTE Consultants Inc. listed as additionally insured);
- .5 50% Performance Bond;
- .6 50% Labour and Materials Bond;
- .7 Emergency Contact Information; and,
- .8 Workers' Training Certificates (Working at Heights and other relevant certifications).

PART 3 SECTION SPECIFIC SUBMITTALS

3.1 General

.1 No work of any section shall be commenced until all submissions of that section have been approved and returned to Contractor by the Consultant.

.2 Coordinate submission of all items of a single section to prevent delays and duplicate submissions.

.3 The Consultant will be entitled to 10 working days from the date of receipt for review of all submissions. If a submission is time sensitive, requiring review prior to end of 10 working days, the Consultant must be notified in writing of the date review must be completed and the reason for the earlier date at the time the original submission is made.

3.2 Submittal Schedule

.1 The following submissions must be made to the Consultant:

Section	Required Submittals
01 00 00 - General Requirements	**Schedule** indicating the timing of the various Work activities and providing detail of critical events that may disrupt the building operations and/or occupants.
	Building Permit and Street Permit
	Professional Liability Insurance and Certificate of Authorization for Engineer's Engaged by the Contractor (If applicable)
01 00 00 - General Requirements	**Pre-existing Deficiencies** in work areas. If one is not submitted, the Contractor is responsible for addressing the deficiencies if the Consultant suspects the deficiency may have been caused by the work.
	Engineered Overhead Protection and Scaffold Drawings: Submit overhead protection and scaffold drawings, signed and sealed by an Engineer licensed to practice in the Work location. Submit written confirmation that the overhead installation has been completed in accordance with the drawings submitted, signed and sealed by an Engineer licensed to practice in the Work location
	Engineered Rigging Plan providing: 1. Diagrams and/or details showing the sequence of disassembly and installation work. 2. Drawings shall be prepared by a professional engineer licensed to practice in the province and are to include set-up location, travel paths, timeframe, and calculations such as load weights, center of gravity, lifting points, sling angles, and required rigging components. 3. Submit written confirmation that the rigging has been field reviewed and accepted by the rigging design Engineer licensed to practice in the Work location.

Section	Required Submittals
05 32 23 – Steel Roof Decking	**Engineered Shop Drawings:** Provide Engineering Shop Drawings to include: 1. Deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories. 2. Indicate details of temporary shoring of steel deck if required.
	Installer Qualifications for the firm and individual powder-actuated fastening system operators indicating that they have sufficient training and experience to install the specified products including any licenses and/or certificates from the product manufacturer(s).
07 26 13 – Roofing Vapour Retarder	**Roof Exterior Sheathing Board Securement Instructions** from the manufacturer specifically providing recommendations on the securement of the sheathing board panels in meeting wind uplift requirements.
	Qualification Data: For installers, include written letter from Manufacturer for this Project indicating approvals and ability to achieve specified warranty.
07 61 13 - Metal Roofing System	**Engineered Shop Drawings:** Provide Engineering Shop Drawings and Calculations to include: 1. Details at eaves, ridge, rake, parapets, curbs, terminations, and eavestroughs and downpipes. 2. All components of the assembly showing construction, methods of joining, bonding, insulation, fastening, sealing, anchorage as well as type of material, thickness, finishes and other pertinent details. 3. Provide engineering calculations in support of metal roofing fastener and anchor locations shown. Show calculations of expansion/contraction allowances and gaps.
	Colour samples: two 150mm x 150mm colour chips
	Qualification Data: For installers, include written letter from Manufacturer for this

Section	Required Submittals
	Project indicating approvals and ability to achieve specified warranty.
	Manufacturer's Warranty Certificate
07 62 00 – Metal Flashing and Trim	**Shop Drawing for Sheet Metal Flashing and Trim** showing details of all flashing, trims and means of attachment.
	Colour samples for each different metal flashing and trim
07 92 00 - Sealants	**Manufacturer Written Recommendations Regarding Elastomeric Joint Sealant Application** as required by this specification section.
23 01 30.51 – HVAC Air Distribution System Protection and Cleaning	**Submittals** listed in the specification section.
	Qualification Data listed in the specification section.
Appendix B - 02 82 00 – Asbestos Remediation	**Submittals** listed in specification sections.

PART 4 MOCK-UPS

4.1 General

.1 No mock-up shall be constructed prior to submission and approval of all required submittals related to the work of the mock-up.

.2 Build mock-ups on site for review and approval prior to beginning construction of the work. Approved mock-ups will constitute part of the finished construction where finishes and textures are the same as those selected by the Owner.

.3 Mock-up installation location will be selected by the Consultant.

.4 Mock-up shall be completed by the same workers who will be completing the full construction, using the tools and products to be used during regular construction.

.5 The Contractor will alert the Consultant and the Owner prior to commencement of the mock-up construction. Construction of the mock-up is not to commence unless the Consultant is present on site.

.6 The Consultant may require field testing of the mock-up. The mock-up will not be approved until such field tests as are deemed necessary have been passed.

.7 Mock-up construction shall be completed such that the construction schedule is not delayed due to corrections or material lead times.

4.2 Mock-up Schedule

.1 The following mock-ups are to be constructed for review by the Consultant:

Section	Required Mock-Ups
06 10 00 – Rough Carpentry for Roofing	**Rough Carpentry at Cricket Location:** Construct carpentry mock-up at one cricket location, including all securement fastening installed.
07 61 13 – Metal Roofing System	**Metal Roofing System:** One mock-up to include eave, rake, ridge and upturn details including all assembly components (membrane, insulation, clips and girts).
	Typical Penetration Flashing: One mock-up to include typical penetration flashing installation.
07 62 00 - Sheet Metal Flashing and Trim	**Sheet Metal Flashing and Trim Details for Sloped Roofing:** One mock-up to include all sheet metal transition details, 2400mm in length. The mock-up shall be complete with all securement fastening installed.
	Eavestrough and Downpipes: Provide mock-up of sufficient size and scope to show typical pattern of seams, fastening details, edge construction, and finish texture and color.

4.3 General

.1 All warranties provided under this section are in addition to those required of the standard CCDC 2 contract as amended by Supplementary Conditions to the Stipulated Price Contract (CCDC 2 -2020).

.2 Unless otherwise stated, the warranty shall include, at no cost to the Owner, all labour and materials to correct the defects and deficiencies. This shall include removal and reinstating components where required to gain access to the defect and/or deficiency. The warranty shall include all performance and aesthetic related issues as determined by the Consultant, such as leakage, de-bonding, corrosion, fading, discolouration, etc. The warranty excludes reasonable wear and tear.

4.4 Warranty Schedule

.1 Provide the following warranties:

Section	Required Warranties	Warranty Period
07 61 13 – Metal Roofing System	Metal Roofing Full System Labour, Material and Workmanship Warranty, (NDL).	25 Years

END OF SECTION

PART 1 GENERAL

1.1 General

Conform to the requirements of the **General Requirements** and **Scope of Work**.

1.2 Related Sections

.1 Section 23 01 30.51 - HVAC Air Distribution System Cleaning.

1.3 Pre-construction Deficiency Inspection

.1 Prior to bringing any material or equipment onto the site, inspect the landscaping, lobbies and corridors which will be accessed for damage, deterioration, excessive wear or soiling. Submit a photographic or video log of the observed deficiencies to the Consultant and Owner. Accept responsibility for any items not identified which require repair, painting or cleaning upon completion or work.

1.4 Protection of Property

.1 Provide plywood or heavy duty elevator curtains or the elevator walls and floors.

.2 Provide drop cloths or tarps on corridor floors at all paths used by the workers.

.3 The use of drop sheets around the interior work area.

.4 Be responsible for maintaining fire access to the building and necessary barricades or signs to control unauthorized access or use.

.5 No storage of materials, tools and equipment will be permitted in hallways and said items must not restrict any paths of egress.

.6 Provide plywood sheathing on the built-up roof areas where equipment is stored. Note that material storage is NOT permitted on the roof and shall be stored at grade in a secured enclosure.

.7 Removed items (roofing, structure etc.) and other debris shall be directly removed to grade and disposed of. Debris cannot be stored on the structure at any time.

.8 Supply and install interior scaffolding and protection within the attic space in accordance with the scope of work.

.9 Provide interior duct protection within the attic to capture debris.

.10 Ensure that interior spaces are made water-tight at the completion of each working day.

1.5 Interior Clean-Up

.1 All waste shall be removed from the interior common spaces the same day that it is generated. This includes the attic space.

.2 At the completion of the work, clean and polish all floors in the paths of travel used.

END OF SECTION

PART 1 GENERAL

1.1 Description

This section species the materials and methods for brick replacement, masonry repointing, and connecting masonry to its structural backing.

1.2 Related Requirements

.1 Section 07 62 00 Sheet Metal Flashing and Trim.

.2 Section 07 92 00 Sealants.

.3 Section 09 91 00 Metal Roofing.

1.3 References

.1 ASTM International:
- .1 ASTM A36/A36M-12, Standard Specification for Carbon Structural Steel.
- .2 ASTM A167-99(R2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .3 ASTM A580/A580M-13a, Standard Specification for Stainless Steel Wire.
- .4 ASTM A641/A641M-09a, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- .5 ASTM A666-10, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- .6 ASTM C216-13, Standard Specification for, Facing Brick (Solid Masonry Units Made of Clay or Shale).

.2 CSA Group:
- .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .2 CAN/CSA-A179-04(R2014) Mortar and Grout for Unit Masonry.
- .3 CAN/CSA-A370-04(R2009), Connectors for Masonry.
- .4 CAN/CSA-A371-04(R2009), Masonry Construction for Buildings.
- .5 CSA S304.1-04(R2010), Design of Masonry Structures.
- .6 CAN/CSA-A82-06(R2011), Fired Masonry Brick Made From Clay or Shale.

1.4 Site Conditions

.1 Assemble and erect components when temperatures are above 4°C.

.2 Hot Weather Requirements:
- .1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.
- .2 Grout shall be placed in masonry at a maximum temperature of 50°C.
- .3 Avoid repointing areas that will be exposed to direct sunlight unless precautions are taken to avoid exceeding the specified maximum temperature.
- .4 Spray mortar surface at intervals and keep moist for maximum of 3 days after installation.

1.5 Delivery, Storage and Handling

.1 Deliver materials to job site in dry condition.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.4 Store and protect masonry accessories from nicks, scratches, and blemishes.

.5 Keep materials dry until use except where wetting of bricks is specified.

.6 Replace defective or damaged materials with new.

1.6 Inspection and Testing

.1 Brick Replacement:
- .1 Notify Consultant for review of the following:
  - .1 Identification of bricks to be removed; and,
  - .2 Brick replacement.

1.7 Quality Assurance and Qualifications

.1 The masonry contractor shall have a minimum of five years of experience on projects of similar size and magnitude and shall provide continuous active supervision while masonry work is in progress.

.2 Site personnel to be trained in Infection Prevention and Control measures necessary for mitigating dust migration into the Hospital.

1.8 Site Measurements

.1 Make site measurements necessary to ensure proper fit of members.

PART 2 MATERIALS AND PRODUCTS

2.1 Manufactured Units

.1 Manufactured Clay Brick Units: to CAN/CSA-A82:
- .1 Type: S
- .2 Grade: EG
- .3 Size: to match existing
- .4 Colour and texture: to match existing
- .5 Solid

2.2 Existing Brick

.1 Use hard, sound and clean existing bricks salvaged on site with Consultant’s approval.

2.3 Masonry Mortar and Grout

.1 Use same brands of materials and source of aggregate for entire project.

.2 Water: potable and free of deleterious matter and acids and alkalis.

.3 Pre-Bagged Mortars:

.1 Pre-bagged Type N mortar, CSA A179 low alkali content cement, with white, type 10, non-staining Portland cement and pre-mixed aggregate (standard grey/beige aggregate, not white silica sand), or approved equivalent:

Manufacturer	Product
Daubois Inc.	Betomix Plus Type N
King Packaged Materials Co.	King 1-1-6 mortar mix
Or Approved Equivalent	

.2 Match mortar as close as possible to existing with respect to colour and texture, as approved by Owner. Coordinate with manufacturer to batch trial mixes for comparison with original mortar. Once accepted by Consultant and Owner, ensure production batches match approved mix design for aggregate mix to maintain uniform colour.

2.4 Masonry Anchorage and Reinforcing

.1 General:

.1 All masonry connectors shall meet the minimum requirements for strength and corrosion protection as defined in CSA A370.
.2 All hot-dipped galvanized components shall be hot dipped after fabrication.
.3 All components required to be stainless steel shall be as per ASTM A580/A666.
.4 Unless otherwise specified, the minimum pullout connector strength shall be 1000N (1kN).

.2 Replacement Dove Tail Ties:

.1 Where encountered in areas of brick removal, replace corroded dove tail ties with new ties with the following characteristics:

Characteristic	Measurement
Thickness	1.52 ± 0.15mm
Width	25 ± 2mm
Minimum width at neck of dovetail	13mm
Length of dovetail end	25mm
Length of hook at mortar embedment end	6mm
Single corrugation	2mm high located 25mm from hook to match the existing

2.5 Flashings

.1 Sheet metal drip edges and end dams:
  .1 Refer to Section 07 62 00 – Sheet Metal Flashing and Trim.

.2 Membrane Flashings:
  Refer to Roofing Vapour Barrier Section 07 26 13.

PART 3 EXECUTION

3.1 Sequence of Work

.1 Perform removals from the upper most masonry unit and proceed down. At all times ensure that masonry adjacent to the work area is fully supported against vertical and lateral movement.

.2 Repair back-up wall as required, to provide a sound substrate for anchors and to provide a solid back up, free of voids.

.3 Reinstate masonry units. Anchor units to back-up wall / provide lateral joint reinforcement as indicated by Consultant.

.4 Repoint joints around masonry units to match existing. Mortar joint colour shall be approved by the Owner.

3.2 Extents

.1 Verify locations and dimensions of areas of Work with Consultant.

.2 In areas of work, identify salvageable bricks with Consultant.

3.3 Removals

.1 Remove chipped, cracked, and otherwise damaged units in exposed masonry and replace with undamaged new units.

.2 Remove existing masonry to the extent required using sufficient care so as not to disturb existing sound masonry, which is to remain.

.3 Avoid cutting into backup concrete, concrete block or masonry. Do not overcut into adjacent cladding or structural components. Stop sawcut short of removal limits and remove remaining mortar by hand with hammer and chisel.

.4 Do not remove masonry connectors where exposed.

.5 Provide shoring as necessary to adequately support masonry at all times. As a minimum, the shoring system shall ensure that no more than a 1m width of masonry is unsupported at any time.

.6 Reinstate at no cost to the Owner, such surrounding undamaged and sound masonry units that have been loosened or damaged by the Contractor during demolition.

.7 Remove all existing mortar from the bonding surface.

.8 Carefully dismantle, clean, and store bricks for re-use if approved by the Consultant.

3.4 Pre-bagged Mortars

.1 Mix masonry mortar in accordance with CSA A179 except where specified otherwise.

.2 Obtain samples of existing mortar from below surface of existing joints. Do not include soiled mortar.

.3 Supply factory coloured mortar to match existing “clean” mortar colour.

.4 Strictly follow mixing procedures called for by the manufacturer. Prepare and mix mortar materials under strict supervision and in small batches for immediate use only. Restrict mortar batching to one experienced worker. Use calibrated equipment. The consistency of grout shall be as recommended by the manufacturer.

.5 Use mortar within 2-1/2 hours when air temperature is less than 25^0C and within 1-1/2 hours when air temperature is 25^0C or higher, or as directed by manufacturer.

3.5 Unit Masonry Restoration

.1 Install new masonry units to match existing lines and levels.

.2 **Bond:** to match existing.

.3 **Coursing Height:** to match existing.

.4 **Jointing:** to match existing.

.5 **Mixing and blending:** mix units within each pallet and with other pallets to ensure uniform blend of colour and texture.

.6 Clean unglazed clay masonry as work progresses.

3.6 Brick Replacement

.1 Repoint all sawcuts or void joints in backup concrete or block prior to replacing brick.

.2 Except in cold weather, wet bricks having an initial rate of absorption exceeding 1 g/minute/1000mm^2 wet to uniform degree of saturation, 3 to 24 hours before laying and not lay until surface dry. For bricks requiring wetting wet tops of walls when recommencing work.

.3 Make bonding surface of existing masonry damp prior to laying new bricks.

.4 New bricks shall be dry prior to laying. Keep face free from stains, chips and cracks. Do not use chipped, cracked or deformed units.

.5 Lay masonry in bonding to match existing in full beds of mortar. In areas of existing brick where bricks are to be replaced, maintain existing bonding pattern. Maintain lines and levels. Maintain vertical face of brick within 3mm.

.6 Buttering corners of units, throwing mortar droppings into joints, deep or excessive furrowing of bed joints, will not be permitted.

.7 Do not shift or tap units after mortar has taken initial set. Where adjustment must be made after mortar has started to set, remove mortar and replace with fresh supply.

.8 When mortar is "thumbprint" hard, tool all mortar joints slightly concave or to match existing. Use sufficient force to press mortar tightly against brick units on both sides of joints.

.9 Lay all joints nominally 10mm thick. Align coursing with existing brickwork.

3.7 Masonry Anchorage and Reinforcement

.1 General:
- .1 Install ties as required by the Scope of Work, drawings, or as directed by the Consultant.
- .2 Adjust connector or tie locations and spacing as required to prevent penetrating through-wall flashings.
- .3 Install connectors and ties in conformance with the manufacturer’s written specifications and CSA-A370.
- .4 Take measures to monitor drilled holes depths to monitor for variations in cavity and wythe widths, and to avoid damaging interior elements.

.2 Tie Spacing:
- .1 Ties shall be located within 300mm from the top of the masonry panels and within 400mm above the bottom of the masonry panels.
- .2 At openings (windows, doors, louvres, etc.), ties shall be located not more than 300mm from the edge of openings.
- .3 In the “field” of the masonry wall, install ties at maximum 800Hx600Vmm on centre.

3.8 Repointing Mortar Joints

.1 Identify areas to be repointed with the Consultant.

.2 Rake the mortar joints square to a depth of 2 to 2-1/2 times the joint thickness.

.3 Remove all loose material from surfaces of the adjacent masonry.

.4 Clear out joints with water to get rid of all loose debris.

.5 Fill the joints with pre-bagged mortar. The mortar shall be well compacted with the substrate.

.6 Mortar joint and colour shall match existing joints.

3.9 Cleaning

.1 All dusting, mortar droppings or other stains on masonry or other surfaces, which were generated by the work, shall be removed as the work progresses.

.2 Perform further cleaning after mortar has set and cured.

.3 Clean masonry with stiff natural bristle brushes and plain water only. Vinegar or chemicals are not to be used without approval of the Consultant.

3.10 Protection

.1 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.

.2 Cover completed and partially completed work not enclosed or sheltered with waterproof coverings at the end of each work day. Anchor securely in position.

.3 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

3.11 Completion of Day's Work

.1 Ensure that all areas of brick/mortar removal are adequately protected from penetration of rainwater.

.2 Protect adjacent finished work against damage, which may be caused by on-going work.

END OF SECTION

PART 1 GENERAL

1.1 Description

This section outlines the work required to provide new corrugated metal roof deck at the sloped roof areas outlined on project drawings.

1.2 Related Requirements

.1 Section 07 26 13 Roofing Vapour Retarder.

.2 Section 07 62 00 Sheet Metal Flashing and Trim.

.3 Section 07 92 00 Sealants.

.4 Section 09 91 00 Metal Roofing.

1.3 References

.1 Design of cladding system in accordance to the latest edition of:

1. ASTM A653.A653M-20 Specification for Steel sheet, zinc-coated (galvanized) or zinc-iron alloy coated (galvannealed) by the hot-dip process.
2. CAN/CSA-S136-26, CAN/CSA-S136S1-04, North American Specification for the design of cold-formed steel structural members.
3. CSA W59-18 Welded Steel Construction.
4. CSSBI 10M-18 Standard for Steel Roof Deck.
5. CSSBI 101M-84, Zinc Coated Structural Quality Steel Sheet for Steel Deck.
6. National Building Code of Canada.
7. Ontario Building Code.

1.4 Delivery, Storage and Handling

.1 Store components and materials in accordance with panel manufacturer's recommendations and protect from elements.

1.5 Design Requirements

.1 Steel deck and connections to steel framing to carry dead, live, and other loads including lateral loads, diaphragm action, composite deck action, and uplift as indicated.

.2 Design steel deck using limit state design in accordance with CSSBI 10M and 12M.

.3 Design deck profiles for indicated loads, minimum thickness and section depths are shown on the drawings. Limit roof deflection under total load of 1/240th of span and under live load to 1/360th of span. Make sections continuous over 3 panels or increase thickness to material to give the equivalent stiffness and strength of a 3 span deck. Design anchorage to resist a gross uplift of 1.44 kPa (30 psf), 2.15 kPa (45 psf) for cantilevers.

1.6 Inspection and Testing

.1 The Consultant may inspect and test materials and work at any time before, during or after installation. Deficient or incomplete work or materials shall be corrected or replaced, as determined by the Engineer, without additional costs or delays to the Owner.

.2 Field inspection of deck shall include verification of correct size, type and gauge, inspection of fasteners, side lap connectors and verification of correct installation in accordance with Contract Documents and manufacturer instructions. Power regulation guides shall be used prior to final direct fastening of mechanical fasteners to properly gauge the fastening system to the base material thickness and hardness.

1.7 Deficient Work

.1 Deficient work or any work failing to strictly conform to the Contract Documents shall be removed and replaced, or repaired if accepted by consultant, at no cost to the Owner or Consultant.

.2 Non-conforming work may be rejected by Owner or Consultant at any time, regardless of prior acceptance in shop drawings, prior inspection, inclusions in certificates of payment.

.3 Deficient work shall include, but not be limited to:
- .1 Bent or warped pieces.
- .2 Damage to structural components.
- .3 Damage to deck coating or paint.
- .4 Unauthorized cutting.
- .5 Surface defects.

PART 2 PRODUCTS

2.1 Roof Deck

.1 The following are acceptable manufacturers for steel deck:
- .1 Canam
- .2 Vicwest
- .3 Ideal Roofing
- .4 Agway Metals
- .5 Or approved equivalent

.2 Steel deck shall be 0.76mm (22 ga, 0.030”) minimum nominal base steel thickness, 38mm (1.5”) maximum deep profile, cellular, interlocking side laps. Decking shall be galvanized to have a zinc coating as per designation G90 (Z275), coating 1 mil thickness minimum.

.3 Use primer to touch up damaged coating and touch up to welds. Primer shall be zinc-rich, ready mix to CAN/CGSB-1.181-99.

2.2 Mechanical Fasteners

.1 Powder-actuated mechanical fasteners for roof deck applications shall have minimum 1/2 inch (12mm) diameter steel washers, knurled shanks, ballistic points and electroplated zinc coating conforming to ASTM B 633, SC 1, Type III. Powder-actuated mechanical fasteners shall be recognized by ICC-ES AC43, SDI listed and approved by Factory Mutual and Underwriter's Laboratories for wind uplift. Powder-actuated mechanical fasteners shall also be listed by Underwriter's Laboratories for fire resistive steel roof deck assemblies in accordance with TLSX & TGKX designs.

.2 Powder-actuated mechanical fasteners shall be Hilti X-ENP-19 L15 or X-HSN-24 types as recommended by the manufacturer for the application.

.3 Self-drilling carbon steel screw mechanical fasteners for roof deck and floor deck applications case hardened to ASTM A510, Grade 1022 with a Zn-Ni coating and shall have a minimum 0.555 inch (14.1mm) washer head, a 5/16 inch (7.85mm) hexagonal drive head, a fluted shank that is 1.340 inches (34mm) long and contains 24 threads per 1 inch (25mm) length of threaded shaft. The fastener is designed for securing steel deck to steel supporting members having a thickness range of 0.0598 to 0.375 in. (1.5 to 9.5mm).

2.3 Corrosion Resistant Paint

.1 Use the following paint to coat corroded steel deck areas:

Manufacturer	Product
Ameron Canada Inc.	Amercoat 370
Or Approved Alternative	

PART 3 EXECUTION

3.1 Re-Coating Corroded Structural Steel

.1 Review the exposed existing structural steel framing (purlins, beams etc.) and identify sections with corrosion to the Consultant.

.2 Prepare all rusted surfaces by power tool cleaning to SSPC-SP3 to produce a smooth clean surface.

.3 Clean all surfaces to be painted to remove dirt and chalk with a Trisodium Phosphate (TSP) solution. Allow surface to drip and paint immediately.

.4 This is only required at the sloped roof metal structure where new metal deck is to be installed.

3.2 Preparation

.1 Steel deck units, accessories and fasteners shall be installed in accordance with manufacturer's recommendations, accepted shop drawings, and as specified herein.

.2 Clean surfaces of supporting steel members. Remove grease, oil, and other deleterious material that may interfere with sound fastening through steel deck and of other fastening of deck units to supports.

.3 Steel deck units shall bear two inches minimum on supporting framework. Laps of roof decks and centering shall be a minimum of 2 inches and shall occur over supports.

.4 Adjust deck units and accessories to final position and accurate alignment. Units shall be free from excessive deflection, local distortions and damage when permanently joined into the structure. Permanently secure deck units prior to their use as storage or working platforms.

.5 Locate deck bundles on the ground so as to prevent overloading of structure.

.6 Systems shown in the Drawings are based on unshored construction for strength considerations. Use shores where required for safety to meet specified tolerances or at option of Contractor.

.7 Touch-up paint where galvanizing has been scratched or damaged.

3.3 Installation of New Metal Deck

.1 Erect steel deck as indicated and in accordance with CSA S136, CSSBI 10M, the SDI Manual of Construction, and in accordance with approved erection drawings. Weld in accordance with CSA W59. Welding companies shall be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel decks and/or CSA W55.3 for resistance welding.

.2 Steel deck shall be placed on to supporting steel and properly positioned before permanently affixing the deck. Mark the location of the purlins and beams onto the deck prior to attaching the deck.

.3 Mechanical Fastening: Direct fastening of steel deck shall be in accordance with manufacturer’s instructions including appearance and quality of fastening of the steel deck. Use only certified or licensed powder-actuated fastening system operators.

.4 Bring steel deck units into direct contact with structural steel supporting members or steel bar joists prior to and during powder-actuated mechanical fastening. Moisture may be present on deck surface during powder-actuated mechanical fastening.

.5 Fasten steel deck units to structural steel supports as noted in the Drawings. Powder-actuated mechanical fasteners shall achieve adequate penetration of the steel deck and supporting member in accordance with manufacturer instructions. Powder-actuated mechanical fasteners shall be appropriately gauged to the base material thickness and hardness prior to final fastening.

.6 Lap ends to 100mm minimum.

.7 Reinforcement of Openings in Deck: Provide reinforcement around openings as shown in the Drawings and in accepted shop drawings. Unframed openings larger than 6 inches shall be reinforced as shown on the Drawings or as necessary, but not less than:

.1 Openings 6 to 12 inches - 16 gauge flat sheet, extending 6 inches beyond hole in all directions, fastened to top of deck.

.2 Openings 12 to 18 inches - 1-3/4 x 1-3/4 x 3/16 inch angle perpendicular to ribs of deck at each end of hole extending 16 inches beyond hole and fastened to top side of deck.

END OF SECTION

PART 1 GENERAL

1.1 Description

This section specifies the installation of wood nailers as defined in the scope of work and drawings to construct the crickets and any other blocking.

1.2 Related Sections

.1 Section 01 33 00 Submittals, Mock-ups and Warranties.

.2 Section 07 61 13 Metal Roofing System.

.3 Section 07 62 00 Sheet Metal Flashing and Trim.

1.3 References

.1 American Society for Testing and Materials International (ASTM):
  .1 ASTM F1667-08 – Nails, Spikes, and Staples.

.2 Canadian Standards Association (CSA):
  .1 CSA B111, Wire Nails, Spikes and Staples.

.3 Factory Mutual:
  .1 Factory Mutual Loss Prevention Data Sheet 1-49.

1.4 Site Conditions

.1 The maximum acceptable wood moisture content is 20%.

1.5 Delivery, Storage and Handling

.1 Protect lumber and other products from dampness both during and after delivery at site.

.2 Pile lumber in stacks in such manner as to provide air circulation around surfaces of each piece.

PART 2 PRODUCTS

2.1 Wood Products

.1 Lumber identification shall be by grade stamp of an agency certified by the Canadian Lumber Standards Accreditation Board.

.2 All lumber shall be Grade #2 or Grade #1.

.3 Wood products shall be used for blocking or framing only. Any sheathing shall be glass-spaced gypsum board as outlined in the Roofing Vapour Retarder Section.

2.2 Rough Hardware

.1 Wall fasteners shall be suitably coated to prevent corrosion with exposure to moisture, and compatible with elements that it contacts, preventing galvanic corrosion between dissimilar metals.

.2 Screws: Wood to Steel:
- .1 Fasteners securing wood to steel elements shall be sized to fully penetrate the steel element a minimum 20mm, and so as not to damage other elements below. Use No. 12 self-tapping stainless steel screw.

.3 Wood to Wood:
- .1 Fasteners securing wood to wood shall be hot dipped galvanized and provide a minimum 30mm embedment into the element being secured to. Use No. 12 wood screw.

PART 3 EXECUTION

3.1 Installation of Wood Framing at Cricket

.1 Layout & Framing:
- .1 Mark the cricket outline on the roof deck, ensuring it directs water properly toward drains or gutters.
- .2 Construct cricket to ensure proper drainage around the dormer.
- .3 Ensure proper integration with adjacent roofing materials to prevent water pooling.

.2 Framing Construction:
- .1 Construct the cricket frame using pressure-treated nominal 2x lumber unless otherwise specified.
- .2 Secure framing members to the roof deck using corrosion-resistant screws or nails, ensuring proper anchorage without damaging the deck.
- .3 Maintain plumb and level framing with properly cut angles for smooth transitions.
- .4 Use blocking and bracing as needed for structural stability.

.3 Sheathing Installation:
1. Install exterior-grade glass-faced gypsum board (minimum ½" thick, or as specified) over the framing.
2. Secure sheathing with galvanized nails or screws, spaced 6" on-center at edges and 12" on-center in the field.
3. Stagger joints to improve structural integrity.
4. Verify that the cricket is correctly sloped, secured, and ready for roofing materials.

3.2 Cleaning

.1 Remove sawdust, nails, and construction debris from the site.

.2 Protect installed rough carpentry from moisture exposure until the roofing system is applied.

END OF SECTION

PART 1 GENERAL

1.1 Description

This Section specifies the supply and application of a vapour retarder / underlayment membrane for the sloped metal roofing application. All work to conform to CRCA Specifications, Manufacturer's printed instructions or the specifications herein. In case of conflict, the most stringent shall apply.

1.2 Related Requirements

.1 Section 01 33 00 Submittals, Mock-ups and Warranties.

.2 Section 07 46 19 Prefinished Metal Cladding.

.3 Section 07 26 13 Metal Roofing System.

.4 Section 07 62 00 Sheet Metal Flashing and Trim.

.5 Section 07 92 00 Sealants.

1.3 References

.1 American Society for Testing and Materials International (ASTM):
- .1 ASTM C1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- .2 ASTM C1177/C1177M-06, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- .3 ASTM D41-05, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
- .4 ASTM D6164-05, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- .5 ASTM E96/E96M-05, Standard Test Methods for Water Vapour Transmission of Materials.
- .6 ASTM E119 – Standard Test Methods for Fire Test of Building Construction and Materials.

.2 Canadian Roofing Contractors Association (CRCA):
- .1 CRCA Roofing Specifications Manual, 2011.

.3 Canadian Standards Association (CSA):
- .1 CSA A123.2-03, Asphalt-Coated Roofing Sheets.
- .2 CSA A123.21 – The Standard Method for the Dynamic Wind Uplift Resistance of Mechanically Attached Membrane – Roofing Systems.

.4 Factory Mutual (FM Global):
- .1 FM Roof Assembly Classifications.

1.4 Site Conditions

.1 Roofing shall conform to the Manufacturer's most recent published recommendations for material application temperatures.

.2 Do not apply vapour retarded during inclement weather or when ambient temperature is expected to be below 5°C. For temperatures below this practice cold weather application techniques as recommended by membrane manufacturer.

.3 Install vapour retarder on dry substrate, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into system.

1.5 Delivery, Storage and Handling

.1 Deliver materials in manufacturer's original, unopened containers with manufacturer's labels intact and legible.

.2 Ensure stored materials are protected from sunlight, precipitation, weather and harmful elements. Materials shall not be exposed to temperatures lower than 10°C or higher than 50°C.

.3 Keep pail good and membrane materials dry, stored in rolls standing on end, selvage edge up, elevated from contact with moisture.

.4 Damaged or wet materials shall be removed from the roof immediately and disposed of off-site by the end of each working day. Allowing wet material to dry is not acceptable.

.5 Handle rolls with care to avoid crushing, puncturing or other damage. Do not use wet or damp membrane or flattened rolls.

.6 Ensure materials stored on roof stay within designated live load limits of roof construction. Do not store materials on, or transport materials across, completed roof areas.

.7 Ensure pail-goods have tight fitting lids when not in use. Store on end in up-right position.

1.6 Quality Assurance and Qualifications

.1 Make no deviation from Specifications or shop drawings without prior written approval by Consultant and, if applicable, Manufacturer.

.2 Arrange for Technical Representative from the membrane Manufacturer to review the required installation of roofing as required to provide the specified warranty.

.3 Installers are to be specialized in the application of roofing vapour retarders approved by the manufacturer with a minimum of 5 years of experience.

PART 2 MATERIALS AND PRODUCTS

2.1 Sheathing Board

.1 Use exterior sheathing board products as listed below, or approved alternate:

Insulation	Standard	Manufacturer	Product	Thickness
Gypsum board with fiberglass mat face, maximum board dimensions of 1200mm x2400mm	ASTM C1177	Georgia-Pacific Gypsum	Dens Deck Prime	13mm
		CGC Inc.	Securock Glass-Mat Roof Board	
		Or Approved Equivalent		

2.2 Vapour Retarder

.1 Use vapour retarder products as listed below, or approved alternative:

Manufacturer	Product
Soprema	Soprema Lastobond Shield HT
Henry	Blueskin RF 200
Or Approved Equivalent	

.2 Accessories:

.1 3mmx25mm flat mechanical fastening bar with 45° or 90° bent sealant edge, hot dipped galvanized steel or aluminum with compatible countersunk fasteners, connected at 200mm spacing. Add fasteners where contact is not firm between fasteners.

.2 Termination sealant shall be compatible with the membrane flashing, as per manufacturer requirements.

.3 Primer shall be compatible with the substrate and recommended by the membrane manufacturer.

2.3 Fasteners

.1 Support panel to steel deck: Corrosion resistant coating as required to penetrate steel deck a minimum of 19mm. Screw is to be self-tapping complete with locking plastic insulation plate:

Manufacturer	Product
Johns Manville	Ultrafast Fasteners and Plates
Lexcan	Lexgrip Roof Fastening System with Plastic Lok Plate
Other approved equivalent	

2.4 Penetration Accessories

.1 In accordance with Section 07 61 13 Metal Roofing System.

PART 3 EXECUTION

3.1 Substrate Preparation

.1 Ensure services are installed through the lower flute only so that they do not penetrate the vapour retarder above.

.2 Prior to commencement of work ensure substrates are dry, free of snow, ice or frost, and clean of dust and debris.

.3 Ensure all protruding and sharp objects are flattened and smooth.

.4 Confirm the deck is supported and secure wherever altered or repaired as part of the work.

.5 Seal all penetrations through the roof deck to limit the risk of roofing materials or debris entering the building, and to provide an air seal. Pack all openings with compressible filler compressed a minimum of 75%. Seal over the compressible filler with rubberized asphaltic mastic.

.6 Commencement of roof system application implies Contractor acceptance of the substrate.

3.2 Mechanically Fastened Sheathing Board

.1 Mechanically fasten the sheathing to the new metal decking using screws and pressure distribution plates fastened to the top of deck flutes. Fastening into the bottom of deck flutes is not acceptable. Fasten to meet the requirements of CSA A123.21 and the wind uplift requirements as outlined in the drawings.

.2 Place boards in parallel rows, with ends staggered a minimum of 300mm (12”), and in firm contact with one another.

.3 Score and cut end pieces to suit and to fit around roof penetrations and deck irregularities.

3.3 Priming

.1 Apply deck primer to roofing substrate at the rate specified by the manufacturer.

.2 Ensure primer is dry to touch before applying vapour retarder.

.3 Re-prime surfaces contaminated with dust.

3.4 Self-Adhered Vapour Retarder

.1 Use sheets of largest practical size to minimize joints.

.2 Allow the vapour retarder to adequately relax or counter roll prior to installation.

.3 Apply the vapour retarder so that it is aligned perpendicular to the slope of the roof in accordance with manufacturer’s instructions.

.4 Apply self-adhered membrane complete and continuous to prepared and primed substrate, parallel to slope, by removing release film providing seam laps in accordance with manufacturer requirements, but no less than 75mm side and 150mm end laps.

.5 Stagger all vertical joints.

.6 The membrane application shall be fully adhered to the substrate, with no air pockets, wrinkles, fish-mouths or tears. Poorly adhered sheets shall be removed and replaced. Once membrane sheets are aligned and are ready to be adhered:
   .1 Apply even pressure along the entire length of the membrane, from center to outer edges, to avoid air inclusions or wrinkles. Repeat for other side.
   .2 At seam overlaps, apply even pressure to seam area.
   .3 Promptly roll all laps and self-adhered membrane with a membrane roller for uniform and continuous adhesion to the substrate.

.7 Extend vapour retarder 150mm all upturns.

.8 Seal vapour retarder termination to building air barrier, where possible; otherwise, seal termination to solid substrate.

.9 Apply mastic to along leading edges at the end of a days' work to prevent adhesion loss and damage.

.10 Repair any damage to vapour retarder to manufacturer's recommendations prior to applying other components.

3.5 Self-Adhered Vapour Retarder Flashings

.1 Repoint any large voids in the masonry cladding, which are to receive the self-adhered membrane. Refer to Section 04 05 23 – Brick Masonry Restoration for requirements.

.2 Clean all dust, loose mortar or other unsound debris from bond surfaces.

.3 Complete installation of the vapour retarder in the field of roof prior to proceeding with the vapour retarder membrane flashing installation.

.4 Apply primer and membrane in strict accordance with the manufacturer's written specifications. Do not apply primer unless all surfaces are completely dry.

.5 Flashings shall be laid in strips one-meter-wide to the vertical surfaces.

.6 Extend flashings up building walls and mechanical curbs, as shown on the drawings.

.7 Lap flashings onto the field of roof vapour retarder a minimum of 150mm.

.8 The membrane application shall be fully adhered to the substrate, with no air pockets, wrinkles, fish-mouths or tears. Poorly adhered sheets shall be removed and replaced. Once membrane sheets are aligned and are ready to be adhered:

.1 Apply even pressure along the entire length of the membrane, from center to outer edges, to avoid air inclusions or wrinkles. Repeat for other side.
.2 At seam overlaps, apply even pressure to seam area.
.3 Promptly roll all laps and self-adhered membrane with a membrane roller for uniform and continuous adhesion to the substrate.

.9 Seal all membrane terminations to prevent water flowing behind or beneath the new membrane flashing.

.10 Install mechanical fastening bar horizontally along top edge of membrane flashing. Install fasteners as required to achieve tight contact with membrane. Seal top horizontal membrane edge with a cap bead of termination sealant, such that the sealant has a minimum bite of 6mm on the back-up wall substrate and covers the entire face of the fastening bar, to seal the fastener heads and holes. Tool sealant applied to assure proper adhesion.

3.6 Roof Penetrations

.1 Follow manufacturer’s printed instructions for installation and the items herein.

.2 Prime flange prior to installation.

.3 Bed flashings into a continuous 3mm thick bed of flashing adhesive. Extend the flashing adhesive a minimum of 150mm (6") beyond the edges of the flange and 50mm (2") up the outside of the projection. Allow time for the adhesive to flash off.

.4 Install a minimum 915mm (36”) by 915mm (36”) reinforcing sheet over the penetration flange that is minimum 150mm wider than the penetration flange on all sides.

.5 Seal perimeter of penetration with termination sealant.

.6 Insulate voids between the penetration and flashing with stone wool and seal the top of the sleeve to the penetration.

END OF SECTION

PART 1 GENERAL

1.1 General

.1 Section Includes the fabrication and installation of cold rolled copper roofing.

1.2 Related Requirements

.1 Section 06 10 53 – Miscellaneous Rough Carpentry.

.2 Section 07 62 00 – Flashing and Trim - Copper.

.3 Section 07 92 00 – Joint Sealants.

1.3 References

.1 Canadian Standards Association (CSA):
- .1 CSA A123.24 – Standard for Self-Adhering Polymer-Modified Bituminous Sheet Materials Used as Roofing Underlayment for Ice Dam Protection.
- .2 CSA A93 – Bituminous Coated Copper Sheets for Roofing and Waterproofing Applications.

.2 Canadian Roofing Contractors Association (CRCA):
- .1 CRCA Roofing Specification Manual.
- .2 CRCA Manual of Accepted Roofing Practices.

.3 ASTM International Standards:
- .1 ASTM B370 – Standard Specification for Copper Sheet and Strip for Building Construction.
- .2 ASTM E1646 – Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems.
- .3 ASTM E2140 – Standard Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head.

1.4 Administrative Requirements

.1 Convene pre-installation meeting one week prior to beginning roofing Work, with roofing contractor's representative and Consultant to:
- .1 Verify project requirements.
- .2 Review installation and substrate conditions.
- .3 Co-ordination with other building subtrades.
- .4 Review manufacturer's installation instructions and warranty requirements.

1.5 Coordination

.1 Coordinate work of this Section with related work specified in other Sections to ensure construction schedule is maintained and water tightness and protection of the building and finished work is maintained at all times.

1.6 Summary of Work

.1 Work of this Section includes the removal and replacement of the existing roof including all related work as indicated in the drawings, as specified herein and as required for a complete project. Provide a complete roofing, flashing and air and vapour barrier system.

.2 'WORK AS DESCRIBED' is held to include all incidental items that by implication, good trade practice, or customary usage are required to complete the work even though they may not be specifically mentioned or shown.

1.7 Action and Informational Submittals

.1 Provide submittals in accordance with established submittal procedures.

.2 Product data:
- .1 Provide an electronic copy of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations for all products to be incorporated in the new system.
- .2 Provide an electronic copy of WHMIS 2015 for:
  - .1 Primers.
  - .2 Adhesives.

.3 Provide shop drawings:
- .1 Indicate flashing, sheet and batten details.

.4 Manufacturer's certificate: Certify that products meet or exceed specified requirements.

1.8 Quality Assurance

.1 Fabricator's Qualifications: Company specializing in copper sheet metal roofing work with three years' experience in similar size and type of installations.

.2 Installer qualifications: Company or person specializing in application of copper roofing systems with 5 years documented experience.

.3 Hold a pre-installation meeting prior to the start of roofing works, with the roofing contractor's representative and the Consultant, to review installation conditions particular to this project.

.4 Industry Standard: Except as otherwise shown or specified, comply with applicable recommendations and details of the "Copper in Architecture" handbook published by the Copper Development Association (CDA). Conform to dimensions and profiles shown.

1.9 General Requirements

.1 Attach roofing to structure to meet requirements of insurance underwriter and authorities having jurisdiction.

.2 Regard manufacturer’s printed recommendations as minimum requirement for materials, methods and workmanship not otherwise specified.

.3 Contact the Consultant if the specifications conflict with the manufacturer’s recommendations. Otherwise, it will be assumed that the Contractor and manufacturer are in agreement with procedures outlined.

.4 Advise the Consultant of adjustments to specified roofing procedures caused by weather and site conditions. Make adjustment to specified procedures only after review with the Consultant.

.5 Maintain equipment in good working order to ensure control of roofing operations and protection of work. Types of roofing equipment and laying techniques to be employed are to meet the approval of the Consultant.

.6 Do not penetrate roof deck with any fastening devices that would do damage or impair the function of the assembly.

1.10 Delivery, Storage and Handling

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS 2015) regarding use, handling, storage, and disposal of, sealing compounds, primers and caulking materials.

.3 Manufacturer’s recommendations for handling and storing products are to be considered a minimum requirement.

.4 Materials shall be delivered to the site, undamaged and in their original packages, with manufacturer’s labels visible, attesting to their conformity to specific standards.

.5 Ensure that shelf life of materials has not expired.

.6 Remove damaged material from site and replace all rejected materials with new product.

.7 Elevate on raised platform and store as to prevent deformation of materials.

.8 Provide and maintain dry, off-ground weatherproof storage.

.9 Store rolls of membrane in upright position. Store membrane rolls with selvage edge up.

.10 Remove only in quantities required for same day use.

.11 Store sealants at +5°C minimum.

.12 Handle roofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.

1.11 Environmental Requirements

.1 Ensure protection of products that are sensitive to damage by moisture.

.2 Ensure protection of the building from weather at all times. Do not work during rain, snow or fog. Stop work and make watertight before the onset of inclement weather or when weather appears imminent.

.3 If it becomes apparent that work would threaten the building watertightness, the Owner has the right to stop work. Any additional expenses due to work stoppage or postponement of work will be at the Contractor's expense.

.4 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

1.12 Compatibility

.1 Compatibility between materials is essential. Use only materials that are known to be compatible when incorporated in a complete assembly. Provide written declaration to the Consultant stating that materials and components, as assembled in system, meet this requirement.

.2 Defective work resulting from work with incompatible materials will be considered the responsibility of the Contractor.

.3 Repair all work that could result in damage or interfere with performance.

PART 2 PRODUCTS

2.1 General

.1 All standards, regulations and specifications listed herein are considered to be the latest available edition.

.2 For sealants refer to Section 07 92 00 – Joint Sealants.

2.2 Sheathing Materials

.1 Refer to Section 07 26 13 Roofing Vapour Retarder.

2.3 Primers

.1 Self-adhesive membrane primer: As recommended by membrane manufacturer. Use low VOC, polymer emulsion-based primer, unless directed otherwise by Consultant on site.

2.4 Self-Adhered Membrane

.1 To CSA A123.22, self-adhering membrane consisting of SBS rubberized asphalt compound laminated to a polyethylene film.
    .1 Standard of acceptance:

.1 Blueskin PE200HT by Henry.
.2 Lastobond Shield HT by Soprema.
.3 Grace Ice & Water Shield HT by GCP.
.4 Or accepted alternate.

2.5 Slip Sheet

.1 3 oz. needle punched polyester fabric.

.2 Standard of acceptance:
  .1 JM 3oz Polyester Slip Sheet.
  .2 Or accepted alternate.

2.6 Sheet Metal Materials

.1 Copper Roofing Sheets: Cold-rolled copper sheet to ASTM B370 temper H00, 6.09 kg/m² (20 oz./ft²) minimum weight, 0.69mm (0.0270 in) minimum thickness.

2.7 Accessories

.1 Isolation coating: Alkali resistant bituminous paint.

.2 Plastic cement: To CAN/CGSB-37.5.

.3 Sealant: As recommended by systems manufacturer and in accordance with Section 07 92 00.

.4 Cleats: Of same material, and temper as sheet metal: 50mm minimum wide:
  .1 Thickness same as sheet metal being secured.

.5 Fasteners: Concealed.

.6 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

.7 Solder: to ASTM B32, lead free.

.8 Flux: rosin, cut muriatic acid, or commercial preparation suitable for materials to be soldered.

2.8 Fabrication

.1 Form individual pieces in 2400mm maximum lengths. Make allowances for expansion at joints.

.2 Hem exposed edges on underside 12mm, mitre and seal.

.3 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.4 Apply minimum 0.2mm dry film thickness coat of plastic cement to both faces of dissimilar metals in contact.

.5 Protect dissimilar metals against oxidization by backpainting with isolation coating where indicated.

.6 Tin edges of copper sheets to be soldered for width of 40mm both sides with solder.

PART 3 EXECUTION

3.1 Quality of Work

.1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual and CRCA Roofing Specification Manual.

.2 Do priming in accordance with manufacturer’s written recommendations.

.3 Make assembly, component and material connections in consideration of appropriate design loads, with reversible mechanical attachments.

.4 In the event that any product contains a manufacturing defect or anomaly, the Contractor shall notify the Consultant and manufacturer immediately and request direction.

3.2 Removal of Existing Roofing

.1 Remove all roofing and flashings, insulation and structural deck and dispose off site.

3.3 Examination

.1 Evaluation and assessment:
- .1 Prior to beginning of work ensure:
  - .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris. Do not use calcium or salt for ice or snow removal.
  - .2 Curbs have been built.
  - .3 Roof drains have been installed at proper elevations relative to finished roof surface.
  - .4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.

.2 Do not install roofing materials during rain or snowfall or when such weather is imminent.

3.4 Protection of In-Place Conditions

.1 Cover walls, walks and adjacent work where materials hoisted or used.

.2 Use warning signs and barriers. Maintain in good order until completion of Work.

.3 Protect roof from traffic and damage. Comply with precautions deemed necessary by Consultant.

.4 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.

.5 Metal connectors and decking will be treated with rust proofing or galvanization.

3.5 Installation

.1 Use concealed fastenings except where approved in writing by Consultant before installation.

.2 Install sheet metal roof panels using cleats spaced at 300mm maximum on centre.

.3 Secure cleats with 2 fasteners each and cover with cleat tabs.

.4 Stagger transverse seams in adjacent panels.

.5 Flash roof penetrations with material matching roof panels, and make watertight.

.6 Form seams in direction of water-flow and make watertight.

.7 Perform soldering with well heated coppers, heat seam thoroughly and sweat solder through its full width.

.8 Clean and flux metals before soldering.

.9 Follow sheet metal manufacturer's recommendations for soldering procedures.

.10 As work progresses, neutralize excess flux with 5% to 10% washing soda solution, and thoroughly rinse. Leave work clean and free of stains.

3.6 Batten Seam Roofing

.1 Remove existing wood batten and install eave protection membrane.

.2 Install new wood batten to match removed.

.3 Use 16 oz. copper sheets for pans not exceeding 500mm wide and use 20 oz copper sheets for pans exceeding 600mm, for long sheets to make batten seam roofing. Turn up sides of sheets to exceed top of battens by 12mm:

- .1 Turn this 12mm at right angles to battens.

.4 Form cross seams with 20mm fold under on lower end:

- .1 Slit folds in cross seams at each corner 25mm in from batten to form tab.
- .2 Form a 50mm fold over on upper end of each sheet.
- .3 Hook 20mm fold on lower end of pan into 50mm fold on upper end of underlaying pan.

.5 Apply sheet metal roofing beginning at eaves.

.6 Place cover strips over battens, locking edges with flanges of pan malleted down against sides of battens.

.1 Cover batten ends with cap folded and locked into extensions of batten covers and vertical legs of pans.

.7 Solder joints to provide watertight seal between new and existing copper roof.

.8 At intersections of roof slope with ridge of hip battens, turn up edges of roof pans against ridge or hip battens, and terminate in 12mm horizontal flange at top of battens:
.1 Install cover strips over top of hip and ridge battens.

.9 Form valleys of sheets not exceeding 3m in length. Lap joints 150mm in direction of flow:
.1 Extend valley sheet minimum 150mm under roofing sheets.
.2 At valley line, double fold valley and roofing sheets.

.10 At eaves, hook pan over edge strip. Extend edge strip up under metal roofing 100mm and secure with nails at 100mm on centre, 25mm from upper end.

.11 Install batten flush with gable unless otherwise detailed. Extend batten cover down exterior face and lock into edge strip.

3.7 Finish

.1 Let copper roof weather through 2 heavy rains minimum after final cleaning.

.2 Rub exposed surfaces with clean rags soaked in boiled linseed oil until desirable shade of brown is obtained.

.3 Touch up solder with copper bronze.

3.8 Eavestrough and Downspout

.1 Refer to Section 07 62 00 – Sheet Metal Flashing and Trim.

3.9 Clean Up

.1 At all times, keep the premises free from accumulation of waste materials or rubbish. Stock piling of debris on the roof will not be permitted.

.2 Clean surfaces and penetrations of all contaminants and touch up to the satisfaction of the Owner. Include rooftop equipment, curbs, soil stacks, sleeves, gas lines, vents, drains and ladders.

.3 At the completion of the work remove all rubbish, tools, equipment and surplus materials.

END OF SECTION

PART 1 GENERAL

1.1 General

This section outlines the Work required to provide a new sloped metal roofing system.

1.2 Related Sections

.1 Section 01 33 00 Submittals, Mock-ups and Warranties.

.2 Section 05 32 23 Steel Roof Decking.

.3 Section 07 26 13 Roofing Vapour Retarder.

.4 Section 07 62 00 Sheet Metal Flashing and Trim.

.5 Section 07 92 00 Sealants.

1.3 Site Conditions

.1 Verify actual dimensions and conditions of construction contiguous with metal cladding panels by field review and measurements before fabrication.

.2 Report in writing to the Consultant any areas of deficiencies or changes in condition revealed that are not part of this Work. Obtain the Consultant's approval and instruction prior to proceeding with the repair work in this area.

.3 All surfaces are to be dry and frost free.

.4 Secure the Work in a safe and watertight fashion before the onset of inclement weather and at the end of each day's work.

1.4 Quality Assurance

.1 Roofing is to be installed by a qualified trade with a minimum of 5 years of experience.

.2 Minor scratches and blemishes shall be touched up and shall match the new adjacent finishes in colour and gloss.

.3 All defective or damaged materials are to be removed from site.

1.5 Delivery, Handling, and Storage

.1 Store components and materials in accordance with panel manufacturer's recommendations and protect from elements.

.2 Protect metal and metal finishes to prevent damage during fabrication, storage, shipping, handling and installation.

.3 Stack units in manner to prevent racking. Do not remove from crates or other protective covering until ready for installation.

1.6 Design Requirements

.1 Design roof system to resist:
- .1 Requirements as per the current edition of the Ontario Building Code
- .2 Snow loads.
- .3 Wind loads (positive and negative) of:
  - .1 End zone width at the ridge and sides: 1.37m (4'-6").
  - .2 Ridge and sides: 2.11 kPa (44 psf).
  - .3 Ridge ends and corners: 2.80 kPa (58 psf).
  - .4 Field: 1.53 kPa (32 psf).
  - .5 Sloped Dormers (entire area): 2.8 kPa (58 psf).
- .4 Dead load of roof system.

.2 Deflection of roof system is not to exceed 1/240th of the space for the specified live loading.

.3 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, overstressing of components, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.

.4 The construction shall provide:
- .1 Such gaskets, baffles, overlaps and seals as required to effectively prevent bulk water entry into the cavities of the system, and to prevent entry of any water into building cavities.
- .2 All openings must be effectively baffled or otherwise guarded to minimize direct water entry, and entry of insects and rodents.
- .3 Adequate drainage of water and condensate to exterior from rain screen cavity. Ensure weepers, vents and drain holes are located in such positions so as to permit free drainage of cavity.

PART 2 MATERIALS AND PRODUCTS

2.1 Roof System

.1 Metal Roof Panels:
- .1 Prefinished roof sheet, exposed to exterior:
  - .1 Z275 galvanized (zinc coated) sheet steel conforming to ASTM A653M structural quality Grade 230 having a nominal core thickness 0.76mm (0.030").
- .2 Use hidden fastener, batten seam roof panels as listed below, or approved alternative:

Manufacturer	Product	Profile Width
Vicwest	Marquis MQ450	17" (432mm)
Agway	Board and Batten (Break Formed)	14" (356mm)
Ideal Roofing	Heritage Series HF-16	16" (406mm)
Robertson Building Systems	BattenLok HS	16" (406mm)
Or Approved Equivalent		

.3 Colour: Prefinished metal panel colour to be patina green to match existing copper roofing colour. Colour samples to be provided to the Owner and Consultant for approval.

.2 Clip and Subgirt System:
.1 Thermally responsive flush mount clip system, designed to allow for full thermal expansion and contraction of the exterior roof sheet. Clips to be fabricated from a minimum of 1.22 mm (0.048") steel, with minimum Z275 galvanized coating.
.2 Continuous hat bar and Z clips made from galvanized material, thickness to suit design parameters, to accommodate depth of insulation.

.3 Roof Fasteners:
.1 As specified by manufacturer, to resist wind uplift and sliding snow forces.

.4 Insulation:
.1 3.5 inches (89mm) thick, high-density, uncoated stone wool insulation board. Minimum acceptable material is Toprock DD by Rockwool.

.5 Air-Vapour Barrier and Transition Membranes:
.1 In accordance with Section 07 27 13 Roofing Vapour Retarder.

.6 Exterior Sheathing Board:
.1 In accordance with Section 07 27 13 Roofing Vapour Retarder.

2.2 Accessories

.1 Flashing: Formed from same materials as the roof sheet. Custom fabricated to suit details, as required.

.2 Closures: Foam and metal closures to suit profiles selected, to manufacturer’s recommendations.

.3 Sealants: In accordance with manufacturer's recommendation and Section 07 92 00.

.4 Penetration Accessories: Pre-manufactured boots or flashing with flange to provide a seal with membrane at level of structural roof deck and at interface of metal roofing panels.

2.3 Fabrication

.1 Co-ordinate and verify at job site dimensions affecting work of this Section.

.2 Fabricate roof components to comply with dimensions, profiles, gauges and details as shown on the Shop Drawings, including fascia and all companion flashing.

.3 Fabricate all components of the system in the factory, ready for field installation.

.4 Construct and assemble to incorporate breaks in panels and install flashing making a strong, watertight assembly capable of being handled to and on site.

.5 Cope, notch and drill so as to provide minimum tolerance throughout system and to fit with hairline joints.

.6 Conceal interconnecting members and fastenings in completed assembly.

.7 Provide joints for vertical expansion and contraction as necessary.

.8 Reinforce total panel as required to prevent oil canning effect and to meet specified design requirement.

.9 Do not cross-break panel faces.

.10 Install air cut-offs in continuous vertical members to prevent stack effect of closed air columns.

.11 Provide roof sheet and all accessories in longest practicable length to minimize field lapping of joints. Where transverse seams are required, as indicated on reviewed shop drawings, secure the transverse seams of cladding sheets in accordance with the details and manufacturer's specifications to provide a weather-tight seal. Limit transverse seams to one per panel length, from ridge to eaves edge of roof.

PART 3 EXECUTION

3.1 Surface Preparation

.1 Remove the existing copper roofing system and the existing precast (gypsum) roof deck panels.

.2 Install new metal roof deck in accordance with Section 05 32 23 Steel Roof Decking.

.3 Consultant to review membrane application prior to proceeding with insulation and roof panel installation.

.4 Ensure surfaces to recieve all components of the metal roofing system are dry, firm, straight and free of loos materials, projections, ice, frost, grease, oil or other matter detrimental to the installation of components.

3.2 Exterior Sheathing Board and Membrane Application

.1 Install roof vapour retarder and exterior sheathing board over new metal decking in accordance with Section 07 26 13 Roofing Vapour Retarder.

.2 Consultant to review membrane application prior to proceeding with insulation and roof panel installation.

3.3 Clip and Subgirt Installation

.1 Clip Support: Install support plate at clip locations as required by manufacturer. Thickness to suit design parameters.

.2 Clip and Subgirts: Attach clips using fasteners as recommended by the manufacturer, to suit the substrate.

.3 Install clips and subgirts in a manner to provide unobstructed drainage within the system.

.4 Apply heavy coat of isolation coating to concealed surfaces of dissimilar metals and metals in direct contact with concrete or masonry.

3.4 Insulation Installation

.1 Install insulation to maintain continuity of the thermal barrier over the roof of the building as indicated on the Drawings.

.2 Install materials in accordance with manufacturer's instructions.

.3 Fit insulation tight to subgirts, support clips, plumbing stacks, mechanical roof curbs and other projections or openings.

.4 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation panels free from ripped backs or chipped or broken edges. Ensure integrity and continuity of insulation at juncture with different types of materials and seal in acceptable manner. Stagger joints in row.

3.5 Roof Panel Installation

.1 Install exterior prefinished roof panels on panel support clips, using manufacturer's proper construction procedure. Ensure metal roofing sheet side-lap is positively retained by clips, and proper sheet coverage is maintained.

.2 Where indicated on approved Shop Drawings, secure the end-lap of metal roofing sheets in accordance with the manufacturer’s Specifications and details to provide a weather-tight seal. Exposed fasteners shall match the colour of the roof sheet.

.3 Make joints neat and fine as practicable. Allow for full expansion and contraction with all components and at interface with adjacent materials. Take into account climatic conditions at time of installation.

.4 Comply with details shown on shop drawings in all aspects:
- .1 Supports
- .2 Fasteners
- .3 Anchors
- .4 Venting

.5 Provide notched and formed closures, sealed against weather penetration at ridges and eaves, where required.

.6 Provide provision for drainage of the system at the at the eaves edge and at roof to building wall transitions.

.7 Install all companion flashing gutters as shown on the details and Shop Drawings. Use concealed fasteners when possible. Exposed fasteners shall match the colour of the roof sheet.

3.6 Installation of Penetration Accessories Flashings

.1 In accordance with Section 07 26 13 Roofing Vapour Retarder.

END OF SECTION

PART 1 GENERAL

1.1 Description

This Section specifies the supply and installation of sheet metal flashing and trim along with metal eavestroughs and downpipes.

1.2 Related Requirements

.1 Section 07 61 13 Metal Roofing System.

.2 Section 07 92 00 Sealants.

1.3 References

.1 American Society for Testing and Materials (ASTM):
- .1 ASTM A653/A653M-11: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy–Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM B32-08: Standard Specification for Solder Metal.

.2 Canadian Roofing Contractors Association (CRCA):
- .1 Roofing Specifications Manual 1997.

.3 Canadian General Standards Board (CGSB):
- .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.4 Canadian Standards Association (CSA International):
- .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
- .1 Material Safety Data Sheets (MSDS).

.6 Sheet metal & Air Conditioning Contractors' National Association (SMACNA):
- .1 Architectural Sheet Metal Manual.

.7 South Coast Air Quality Management District (SCAQMD), California State:
- .1 SCAQMD Rule #1113-04, Architectural Coatings.
- .2 SCAQMD Rule #1168-05, Adhesives and Sealants.

1.4 Quality Assurance

.1 Sheet metal flashing and coping shall be installed to withstand wind loads, structural movement, thermally induced movement resulting from temperature change, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

.2 Sheet metal flashing and trim shall be installed in a manner that does not allow water infiltration to the building interior.

1.5 Delivery, Storage and Handling

.1 Store material in a secure location, protected from any damages.

.2 Any dented, scratched or otherwise damaged materials will not be accepted for installation.

PART 2 PRODUCTS

2.1 Fastening Strips

.1 20 gauge galvanized sheet metal.

2.2 Finished Sheet Metal

.1 Exterior Trim: 24-gauge galvanized prefinished sheet steel sized to project requirements. Colour(s) are to be selected from Standard 8000+ Series Colour Chart by the Owner to match parapets, window frames and new metal cladding colour. To meet or exceed CGSB 93-GP-3M "Sheet Steel Galvanized Prefinished Residential". All flashing and trim to have folded edges where exposed.

2.3 Eavestroughs and Downpipes

.1 Form eaves troughs from 24-gauge prefinished galvanized sheet metal. Eavestrough to be roll formed 150mm wide with profile to match existing and colour-matched to the sloped metal roof.

.2 Downpipe shall be from 24-gauge prefinished galvanized sheet metal 100mm by 75mm square, with elbow at bottom discharge point and 1000mm extension.

.3 Concrete Splash Pad Pavers:
- .1 Exterior grade precast concrete pavers 600x600x50mm (24"x24"x2”) with non-slip top surface and flat bottom surface, installed on top of 25mm (1”) thick extruded polystyrene insulation.
- .2 Colour to be Natural.

2.4 Accessories

.1 **Isolation coating:** alkali resistant bituminous paint.

.2 **Plastic cement:** to CAN/CGSB 37.5.

.3 **Screws:** Self-tapping. Colour matched coated heads by Tapcon.

.4 **Rivets:** Stainless steel. Size to suit application. Colour to match siding. (Used only where permitted by Consultant).

.5 **Nail Anchors:** Galvanized steel nail in plastic insert with mushroom head. Sized to suit application, with minimum 25mm penetration into substrate.

.6 **Cleats:** of same material, and temper as sheet metal, minimum 50mm wide. Thickness same as sheet metal being secured.

.7 **Washers:** of same material as sheet metal, 1mm thick with rubber packings.

.8 **Touch-up paint:** as recommended by prefinished material manufacturer.

.9 **Eavestrough Straps:** Minimum 20-guage strap hangers of same material and colour as eavestroughs.

.10 **Eavestrough End Caps:** to match material colour, finish, and thickness of eavestrough unless otherwise indicated.

.11 **Downpipe Brackets:** to match material colour, finish, and thickness of downspouts unless otherwise indicated.

.12 **Eavestrough and Downpipe Fasteners:** Non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.

2.5 Sealant

.1 Conform to the requirements of Section 07 92 00 - Sealants.

.2 Colour to match sheet metal or approved by the Owner.

2.6 Membrane Flashing

.1 Membrane flashings that are to be applied under sheet metal are to be in accordance with Section 07 26 13 Roofing Vapour Retarder.

2.7 Fabrication

.1 Sheet Metal Flashing:
- .1 Form pieces in 2400mm maximum lengths. Make allowance for expansion at joints.
- .2 Hem exposed edges on underside 12mm. Mitre and seal corners with sealant.
- .3 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .4 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.
- .5 All drip edges to be a minimum of 38mm projection from building façade.
- .6 All flashings are to have positive slope away from building to facilitate drainage.

.2 Eavestroughs and Downpipes:
- .1 Fabricate eavestroughs, downspouts, and accessories in longest practical lengths.
- .2 Eavestroughs shall be factory or field formed as required.
- .3 Provide mitered sealed eavestrough corners. Corners shall extend 12” from the corner in each direction. Lap joint and sealant where connecting to continuous eavestrough.

.4 Form all seams to be weatherproof, leaving room for expansion and contraction with specified and required tolerances.
.5 Form sections square, true, and accurate in size. Form free from distortion or defects detrimental to appearance or performance. Allow for expansion at corners and joints.
.6 Field measure conditions prior to fabricating work.

PART 3 EXECUTION

3.1 Surface Preparation

.1 Ensure the substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Flashing Installation

.1 Install sheet metal in conformance with the details shown on the drawings and in accordance with the SMACNA “Architectural Sheet Metal Manual”.

.2 Ensure that all horizontal surfaces have positive slope. Panned surfaces are not acceptable.

.3 Use concealed fastenings except where approved before installation.

.4 Provide underlay under sheet metal.

.5 Counter-flash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock joints.

.6 Lock end joints and caulk with sealant.

.7 Install surface mounted reglets true and level, and caulk top of reglet with sealant.

.8 Turn top edge of flashing into recessed reglet or mortar joint a minimum of 25mm. Lead wedge flashing securely into joint.

.9 Insert metal flashing under cap flashing to form weather tight junction.

.10 Provide membrane flashing under sheet metal caps over walls. Drain the membrane to the exterior. Lap all joints. Bond to substrate.

3.3 Eavestroughs and Downpipes

.1 Install eavestroughs and downpipes in conformance with the details shown on the drawings and in accordance with the SMACNA “Architectural Sheet Metal Manual”.

.2 Do not install damaged components.

.3 Install units plumb, level, square, and free from wrap or twist while maintaining dimensional tolerances and alignment with surrounding construction; except install eavestroughs with required slope.

.4 Fit eavestroughs to downspouts and flashings for watertight connections. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

.5 Eavestroughs:
- .1 Install eavestroughs and secure to building at 750mm on center with eavestrough straps.
- .2 Slope eavestroughs to downpipes, not less than 1/8 inch per foot (1:100) as indicated.
- .3 Seal joints watertight.
- .4 Provide expansion joints at a maximum spacing of 15m (50') between joint or downspout connections.
- .5 Provide end caps at eavestrough end and seal watertight.
- .6 Flash and seal eavestrough to downspout.

.6 Downpipes:
- .1 Install downpipes at all locations shown on the Drawings and provide goosenecks back to wall.
- .2 Secure downpipes to wall with straps at 1800mm on center, minimum two straps per downpipe.
- .3 Provide 45-degree elbow at bottom of downspout to direct water away from wall surface.
- .4 Install concrete splash pads at the base of each downpipe.

3.4 Cleaning

.1 On completion and verification of performance and installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Leave work areas clean, free from grease, finger marks and stains.

.3 Touch up any scratches in the finish.

.4 The Consultant will reject any damaged sheet metal that has been installed.

END OF SECTION

PART 1 GENERAL

1.1 Summary

.1 Section Includes shop and field formed copper accessories and trim, such as:
- .1 Counterflashing and base flashing;
- .2 Wall flashings; and,
- .3 Accessories.

.2 Related Requirements:
- .1 Sealants are generally specified in 07 92 00 – Sealants.

1.2 Coordination

.1 Coordinate work of this section with interfacing and adjacent work for proper sequencing. Ensure weather resistance and durability of work and protection of materials and finishes.

1.3 Performance Requirements

.1 Installation Requirements: Fabricator is responsible for installing system, including anchorage to substrate and necessary modifications to meet specified and drawn requirements and maintain visual design concepts in accordance with Contract Documents and following installation methods as stipulated in the "Copper in Architecture" handbook published by the Copper Development Association (CDA).
- .1 Drawings are diagrammatic and are intended to establish basic dimension of units, sight lines, and profiles of units.
- .2 Make modifications only to meet field conditions and to ensure fitting of system components.
- .3 Obtain Consultant's approval of modifications.
- .4 Provide concealed fastening wherever possible.
- .5 Attachment considerations: Account for site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening and fracturing connection between units and building structure or between components themselves.
- .6 Obtain Consultant's approval for connections to building elements at locations other than indicated in Drawings.
- .7 Accommodate building structure deflections in system connections to structure.

.2 Performance Requirements:
- .1 System shall accommodate movement of components without buckling, failure of joint seals, undue stress on fasteners, or other detrimental effects when subjected to seasonal temperature changes and live loads.
- .2 Design system capable of withstanding building code requirements for negative wind pressure.

1.4 Quality Assurance

.1 Fabricator's Qualifications: Company specializing in copper flashing and trim work with 5 years' experience in similar size and type of installations.

.2 Installer: A firm with 5 years of successful experience with installation of copper flashing and trim work of type and scope equivalent to Work of this Section.

.3 Industry Standard: Except as otherwise shown or specified, comply with applicable recommendations and details of the "Copper in Architecture" handbook published by the Copper Development Association (CDA). Conform to dimensions and profiles shown.

1.5 Delivery, Storage and Handling

.1 Packing, Shipping, Handling, and Unloading: Protect finish metal faces.

.2 Acceptance at Site: Examine each component and accessory as delivered and confirm that material and finish is undamaged. Do not accept or install damaged materials.

.3 Storage and Protection:
- .1 Stack pre-formed material to prevent twisting, bending, and abrasions;
- .2 Provide ventilation; and,
- .3 Prevent contact with materials which may cause discoloration or staining.

PART 2 PRODUCTS

2.1 Flashing and Trim Materials

.1 Copper: ASTM B370; temper H00 (cold-rolled) except where temper 060 is required for forming:
- .1 16 oz. per sq. ft. (0.0216-inch thick) (0.55mm) accept as otherwise indicated.

2.2 Laminated Composition Sheet Flashing

.1 Copper/Fiberglass Laminated Flashing:
- .1 Description: Asphalt free copper fabric flashing, 5 ounce minimum weight.
- .2 Material: Copper sheet with 060 temper conforming to ASTM B370 bonded with a proprietary rubber based adhesive, between two layers of fiberglass fabric weighing not less than 0.3 oz./sq./layer with a minimum of 20x20 threads per inch.

.2 Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

.3 Products: Subject to compliance with requirements, provide one of the following:
- .1 Copper Sealtite 2000, Advanced Building Products, Inc.;
- .2 Multi-Flash 500 Series Asphalt Free, York Manufacturing, Inc; and,
- .3 Or approved equivalent.

2.3 Accessories

.1 **Solder**: ASTM B32; Provide 50-50 tin/lead or lead free alternative of similar or greater strength solder. Killed acid flux.

.2 **Flux:** Muriatic acid neutralized with zinc or approved brand of soldering flux.

.3 **Fasteners**: Same metal as flashing/sheet metal or other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.

.4 **Bituminous Coating**: SSPC - Paint 12, Cold-Applied Asphalt Mastic (Extra Thick Film), nominally free of sulfur, compounded for 15-mil dry film thickness per coat.

.5 **Joint Sealant**: One-part, copper compatible elastomeric polyurethane or silicone rubber sealant as tested by sealant manufacturer for copper substrates. Refer to Division 07.

.6 **Adhesives**: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of and compatibility with flashing sheet.

.7 **High Temperature Grade Water Barrier Underlayment**: Cold applied, self-adhering membrane composed of a high density, cross laminated polyethylene film coated on one side with a layer of butyl rubber or high temperature asphalt adhesive. Provide primer when recommended by water barrier manufacturer:

- .1 Minimum Thickness: 30 mil.
- .2 Tensile Strength: ASTM D412 (Die C Modified); 250 psi.
- .3 Membrane Elongation: ASTM D412 (Die C Modified); 250%
- .4 Permeance (Max): ASTM E96; 0.05 Perms.
- .5 Acceptable Products:
  - .1 Blueskin PE 200 HT, Henry;
  - .2 Ultra, W.R. Grace Company;
  - .3 CCW MiraDRI WIP 300 High Temperature, Carlisle Coatings and Waterproofing; and,
  - .4 Or approved equivalent.

2.4 Fabrication

.1 General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of Copper Development Association (CDA) "Copper in Architecture" handbook and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed copper work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

- .1 Fabricate to allow for adjustments in field for proper anchoring and joining.
- .2 Form sections true to shape, accurate in size, square, free from distortion and defects.

.3 Cleats: Fabricate cleats of same material as sheet, interlockable with sheet in accordance with CDA recommendations.
.4 Fabricate corners from one piece with minimum 18 inch (450mm) long legs; solder for rigidity if required; seal non-soldered weather joints with sealant.

.2 Seams: Fabricate non-moving seams with flat-lock seams where possible. Tin edges and cleats to be seamed, form seams, and solder. Where soldered flat-lock seams are not possible, use soldered riveted lap seams joints for additional strength.

.3 Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1-inch (25mm) deep, filled with mastic sealant (concealed within joints).

.4 Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with CDA standards.

.5 Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

.6 Solder:
.1 Solder and seal metal joints except those indicated or required to be expansive type joints.
.2 Tin edges of copper sheets and cleats at soldered joints.
.3 After soldering, carefully remove flux and other residue from surfaces. Neutralize acid flux by washing with baking soda solution and then flushing clear water rinse. Wipe and wash solder joints clean.

.7 Seams:
.1 Provide following seam types unless noted or detailed otherwise.
.2 Flat: Drive cleat.
.3 Corner: Double lock corner.
.4 Standing: Double lock standing lap seam.

.8 Copper Thickness: Comply with CDA recommendations for copper size and shape.

.9 Flashing and Counter Flashing:
.1 Fabricate as indicated on Drawings and in accordance with the CDA "Copper in Architecture" handbook.
.2 Hem exposed flashings on underside 1/2 inch (13mm); miter and seam corners.
.3 Fabricate vertical faces with bottom edge formed outward 25mm and hemmed to form drip.
.4 Fabricate flashings to allow toe to extend minimum 2 inches (50mm) over wall surfaces.

2.5 Finishes

.1 Natural weathering mill finished copper. No applied finish.

PART 3 EXECUTION

3.1 Examination

.1 General: Examine conditions and proceed with work when substrates are ready.

.2 Confirm that substrate system is even, smooth, sound, clean, dry, and free from defects.

3.2 Installation

.1 General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations and with the "Copper in Architecture" handbook published by the Copper Development Association (CDA). Anchor units of work securely in place by methods indicated, providing for thermal expansion of units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.

- .1 Install units plumb, level, square, and free from warp or twist while maintaining dimensional tolerances and alignment with surrounding construction.
- .2 Apply asphalt mastic on copper surfaces of units in contact with dissimilar metals.
- .3 Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- .4 Miter, lap seam and close corner joints with solder. Seal seams and joints watertight.
- .5 Install expansion joints at frequency recommended by CDA. Do not fasten moving seams such that movement is restricted.
- .6 Coordinate with installation of roofing system and roof accessories.

.2 Underlayment: Install red rosin paper slip sheet over layer of asphalt saturated felt.

.3 Bed flanges of work in a thick coat of bituminous roofing cement.

.4 Install reglets to receive counterflashing in manner and by methods indicated. Where shown in masonry, furnish reglets to trades of masonry work.

.5 Counterflashing and Reglets:

- .1 Fabricate counterflashings and reglets as 2 piece assemblies to permit installation of counterflashing after base flashings are in place.
- .2 Fabricate reglets of same metal and thickness as counterflashings.
- .3 Overlap roof base flashing 4 inches (100mm) minimum.
- .4 Install bottom edge tight against base flashing.
- .5 Lap seam vertical joints 3 inches (75mm) minimum and apply sealant.

.6 Install counterflashing in reglets, either by snap-in seal arrangement; lock seal in accordance with the "Copper in Architecture" handbook published by the Copper Development Association (CDA), or by soldering in place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure.

.7 Install laminated flashing in accordance with manufacturer's recommendations. Where required, provide for movement at joints by forming loops or bellows in width of flashing. Locate cover or filler strips at joints to facilitate complete drainage of water from flashing. Seam adjacent flashing sheets with adhesive, seal and anchor edges in accordance with manufacturer's recommendations.

.8 Fasten flashing to curb nailers at maximum spacing of 3 inches (75mm) O.C. Fabricate seams at joints between units with minimum 4-inch (100mm) overlap, to form continuous, waterproof system in accordance with the "Copper in Architecture" handbook published by the Copper Development Association (CDA).

3.3 Cleaning

.1 Remove protective film (if any) from exposed surfaces of copper promptly upon installation. Strip with care to avoid damage to finishes.

.2 Clean exposed copper surfaces, removing substances that might cause abnormal discoloration of metal.

.3 Upon completion of each area of soldering, carefully remove flux and other residue from surfaces. Neutralize acid flux by washing with baking soda solution, and then flushing with clear water rinse. Use special care to neutralize and clean crevices.

.4 Clean exposed metal surfaces of substances that would interfere with normal oxidation and weathering.

3.4 Protection

.1 Advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering at time of Substantial Completion.

END OF SECTION

PART 1 GENERAL

1.1 Description

This Section specifies the materials and methods for work involving sealants. This includes new sealants at the window perimeter and sealants at metal to metal joints. Termination sealants are covered in the Roofing Vapour Barrier Section.

1.2 Related Work

.1 Section 07 62 00 Sheet Metal Flashing and Trim.

.2 Section 07 72 00 Roof Accessories.

.3 Section 09 91 00 Metal Roofing.

1.3 References

.1 American Society for Testing and Materials (ASTM):
- .1 ASTM C510, Standard Test Method for Staining and Color Change of Single or Multicomponent Joint Sealants.
- .2 ASTM C661, Standard Test Method for Indentation Hardness of Elastomeric Type Sealants by Means of a Durometer.
- .3 ASTM C719, Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
- .4 ASTM C794, Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
- .5 ASTM C920, Standard Specification for Elastomeric Joint Sealants.
- .6 ASTM C1193, Guide for Use of Joint Sealants.
- .7 ASTM C1247, Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids.
- .8 ASTM C1248, Standard Test Method for Staining of Porous Substrate by Joint Sealants.
- .9 ASTM C1311, Specification for Solvent Release Sealants.
- .10 ASTM C1330, Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
- .11 ASTM C1521, Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.
- .12 ASTM D2203, Standard Test Method for Staining from Sealants.
- .13 ASTM D2240, Test Method for Rubber Property - Durometer Hardness.

1.4 Delivery, Storage and Handling

.1 Deliver materials to site in original factory packaging, labeled with manufacturer's name and address.

.2 Store materials off ground, indoors in dry location and in accordance with manufacturer's recommendation in clean, dry, well-ventilated area.

.3 Replace defective or damaged materials with new.

1.5 Site Conditions

.1 Proceed with installation of joint sealants only when:
- .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4°C. Should it become necessary to apply sealants at temperatures below 5°C, inform the Consultant and consult the sealant manufacturer's representative. Proceed on their written instructions only.
- .2 When working in cold temperatures, only clean/prime as much surfaces that can be sealed before frost and/or condensation re-occur.
- .3 Joint substrates are dry and frost free.
- .4 Conform to manufacturer's recommended temperature, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.2 Joint substrate conditions:
- .1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

1.6 Quality Assurance and Qualifications

.1 Surface preparation and sealant installation shall be carried out by a recognized specialized applicator that is thoroughly trained and competent in all aspects of this work.

.2 Single Source Responsibility: Provide exterior joint sealants by a single manufacturer responsible for testing of Project substrates to verify compatibility and adhesion of joint sealants.

.3 Notify Consultant for review of surface preparation prior to sealant application, and completed sealant application prior to demobilizing from each work area.

PART 2 PRODUCTS

2.1 Exterior Sealants

.1 Sealant Types and Locations:

Sealant Type	Joint Location/Type	Colour
Silicone	Metal to metal. Metal to brick.	Match sheet metal

.2 Silicone Sealants:
- .1 For all-purpose silicone sealants, use one of the following Type S, Grade NS, Class 50, moisture curing silicone sealant, conforming to ASTM C 920 and CAN/CGSB-19-13-M:

Manufacturer	Product
Dow Corning Canada Inc.	Dow 795
Momentive Performance Materials	GE SilPruf SCS2000
Tremco Ltd.	Spectrem 2
Sika Construction	Sikasil WS-295
Or approved equivalent.	

2.2 Cleaners and Primers

.1 Cleaners:
- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.

.2 Primers:
- .1 Use primers in accordance with sealant manufacturer's specifications.
- .2 Primers shall be recommended by the sealant manufacturer for surfaces to be adhered to and shall not be detrimental to the surface to which it comes in contact.

2.3 Joint Backing Material

.1 Cylindrical Sealant Backing at window perimeter: ASTM C 1330, Type B non-absorbent, bi-cellular material with surface skin, or Type O open-cell polyurethane, as recommended by sealant manufacturer for application.

.2 Bond Breaker Tape: Polymer tape compatible with joint sealant materials and recommended by sealant manufacturer.

PART 3 EXECUTION

3.1 Examination

.1 Verify that conditions of existing substrate are acceptable for joint sealants installation in accordance with manufacturer's written instructions.

3.2 Surface Preparation

.1 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.2 Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
- .1 Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

.2 Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods in addition to solvent cleaning to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Remove laitance and form-release agents from concrete.

.3 Clean porous and nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

.3 Clean only as much area as can be sealed in one 1 hour. If cleaned areas are exposed to rain or contaminants (dirt, dust, etc.), the surface must be cleaned again. Clean existing silicone sealant that is sufficiently adhered and not mechanically damaged to prepare for recapping. Use two-cloth solvent wipe in accordance with ASTM C 1193.

.4 Ensure joint surfaces are dry and frost free.

3.3 Priming

.1 Select priming material compatible with sealant manufacturer.

.2 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.3 Prime joint substrates when recommended by sealant manufacturer or when indicated by preconstruction testing or experience. Apply recommended primer using sealant manufacturer's recommended application techniques.

.4 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking. If primed areas are exposed to rain or contaminants (dirt, dust, etc.), the surface must be cleaned and re-primed.

3.4 Backup Material

.1 Select backup material compatible with sealant manufacturer.

.2 Select joint backing materials recommended by sealant manufacturer to be compatible with sealant material. Install backing material at depth required to produce profile of joint sealant allowing optimal sealant movement. Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

.3 Install bond breaker tape over substrates when sealant backings are not used.

.4 Joint backing must be thoroughly dry. Do not install more joint backing and bond breaker tape than can be sealed in one working day.

3.5 Application

.1 Install sealants using methods recommended by sealant manufacturer, in depths between 6.4 and 12.7mm unless otherwise recommended for application. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.

.2 Use sufficient pressure to fill voids and joints solid. Ensure sealant is well adhered to joint backing and substrate.

.3 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.4 Tool exposed surfaces before skinning begins to give slightly concave shape. Tool sealants immediately with appropriately shaped tool to force sealants against joint backing and joint substrates, eliminating voids and ensuring full contact. Using tooling agents approved by sealant manufacturer for application.

.5 Remove excess compound promptly as work progresses and upon completion, before compound cures.

.6 Ensure existing drainage holes provided for wall systems are not blocked by the sealant material.

.7 Profile:

- .1 Maintain the minimum and maximum sealant depths as recommended by the manufacturer. Provide sealant depth that is ½ the joint width where possible within these limits. Increase average sealant size as required to accommodate application tolerances.
- .2 Unless otherwise approved by the Consultant, joint widths shall be greater than 10mm. Identify any joint widths less than this width to the Consultant for direction.
- .3 For joints wider than 19mm, application of sealant in several passes may be required (depend on joint configuration, weather conditions, access and material type). Follow the sealant manufacturer’s recommendations for maximum joint width and application methods.

.8 Curing:

- .1 Cure sealants in accordance with sealant manufacturer's instructions.
- .2 Do not cover up sealants until proper curing has taken place.

3.6 Cleaning

.1 Leave Work area clean at end of each day.

.2 Clean adjacent surfaces immediately.

.3 Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.

.4 Remove masking tape immediately after tooling joint without disturbing seal.

.5 Remove excess sealant from nonporous surfaces while still uncured.

3.7 Protection

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by joint sealants installation.

END OF SECTION

PART 1 GENERAL

1.1 Summary

This section outlines the requirements for the protection of HVAC systems during construction, including filtration, protection and post-construction cleaning.

1.2 Reference

.1 Abbreviations and Acronyms: See ACR, The NADCA Standard.

.2 Reference Standards:
- .1 Following current standards and publications of issues currently in effect form part of this specification to extent specified:
  - .1 American National Standards Institute/Institute of Inspection Cleaning and Restoration Certification (ANSI/IICRC).
    - .1 ANSI/IICRC S520 - Standard for Professional Mold Remediation.
- .2 National Air Duct Cleaners Association (NADCA) – ACR Standard for Assessment, Cleaning & Restoration of HVAC Systems.
- .3 ASHRAE 62.1 – Ventilation for Acceptable Indoor Air Quality.
- .4 National Fire Protection Association (NFPA):
  - .1 NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems.
  - .2 NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.
- .5 North American Insulation Manufacturers Association (NAIMA):
  - .1 Cleaning Fibrous Glass Insulated Air Duct Systems.
- .6 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA):
  - .1 HVAC Duct Construction Standards - Metal and Flexible.
- .7 Underwriters' Laboratories (UL):
  - .1 UL Standard 181 - UL Standard for Safety Factory-Made Air Ducts and Connectors.
  - .2 UL Standard 181A - UL Standard for Safety Closure Systems for Use with Rigid Air Ducts.
  - .3 UL Standard 181B - Standard for Closure Systems for Use With Flexible Air Ducts and Air Connectors.
  - .4 UL Standard 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

1.3 Administration Requirements

.1 Coordination:
- .1 Coordinate the Work of this section with the work of other trades, and the work of different contractors.

.2 Sequencing:
- .1 Perform duct cleaning work after construction.

1.4 Submittals

.1 Informational Submittals:
- .1 Duct cleaning plan: Before commencing cleaning work, submit written work plan including following information:
  - .1 Scope of Work identifying HVAC components to be cleaned or restored.
  - .2 Itemize specific environmental engineering controls required for workspace, and special work requirements.
  - .3 Detail cleaning work means and methods.
  - .4 Name, contact information, and functional tasks performed by each representative of each firm and contractor involved with the work.
- .2 Manufacturer's Instructions: Submit cleaning agent product installation instructions.
- .3 Field Quality Control Submittals:
  - .1 Submit laboratory analysis results if NADCA Vacuum Test is used for cleanliness verification.
  - .2 Submit documentation detailing chain of custody for test samples if outside laboratories or testing agencies performed sample analysis or testing.
- .4 Qualification Statements: Show membership status, project experience, and certifications for:
  - .1 HVAC Cleaning Contractor.
  - .2 Supervisor.
  - .3 Inspector.
  - .4 Hygienist.
  - .5 Testing Agency.

.2 Closeout Submittals:
- .1 Record Documentation: Submit documentation verifying compliance with this specification for work performed. This documentation may include:
  - .1 Completion of cleaning work, as verified by the Consultant's visual inspection and verification of cleanliness.

1.5 Qualifications

.1 HVAC System Cleaning Contractor: Must abide by all guidelines and regulations outlined by the NADCA.:
- .1 Supervisor: Employ NADCA-certified Air Systems Cleaning Specialist (ASCS) responsible for project oversight.
- .2 Inspector: Employ NADCA-Certified ASCS, or NADCA-Certified Ventilation Inspector (CVI) to perform site inspections.

PART 2 PRODUCTS

2.1 Cleaning Materials and Equipment

.1 Cleaning Agents: Mild Detergent Solution (pH Neutral Soap & Water).

.2 Water: Potable.

.3 Use HEPA-filtered vacuum systems to prevent recontamination.

.4 Use mechanical agitation tools, such as rotary brushes, air whips, and compressed air nozzles, to dislodge debris.

.5 Protective Materials: Polyethylene Sheeting (6 mil minimum thickness) and non-damaging contractor tape.

PART 3 EXECUTION

3.1 Pre-Protection Requirements

.1 Before installing protection materials, inspect HVAC equipment for pre-existing dust, debris, or damage.

.2 Confirm that HVAC systems are turned off and isolated per project requirements.

.3 Ensure all protective measures remain accessible for periodic inspection and maintenance.

3.2 Protection Installation

.1 Make-up Air Units (MAUA) & Air Handling Units (AHUs):
- .1 Wrap intake and exhaust openings with 6 mil polyethylene sheeting, secured with tape.
- .2 Ensure all control panels remain accessible for periodic system checks.

.2 Duct Openings, Vents, Diffusers, and Grilles:
- .1 Cover with temporary duct protection film.
- .2 Secure edges with low-residue tape to prevent air leaks and contamination.
- .3 For larger openings, use sealed plywood covers fastened with non-penetrating clips.

.3 Exhaust Fans & Rooftop HVAC Equipment:
- .1 Protect exhaust fan inlets and outlets with poly sheeting or rigid covers.
- .2 Maintain weatherproofing while ensuring protection from airborne dust.

.4 Other Equipment Within the Attic:
- .1 Wrap exposed components (e.g., coils, motors) with poly sheeting.
- .2 Maintain clear access for emergency shutdown procedures.

3.3 Protection Maintenance & Removal

1. Conduct weekly inspections to ensure protective materials remain secure and intact.

2. If HVAC protection is compromised (e.g., torn sheeting), replace or resecure immediately.

3. Remove protective coverings only during final cleaning and pre-commissioning phase.

4. Clean all surfaces before activating HVAC equipment to ensure system integrity.

3.3 Pre-Cleaning Inspection

.1 Conduct a visual inspection of ductwork using cameras or access points to assess contamination levels.

.2 Verify that duct systems are sealed and isolated from ongoing construction activities.

3.4 HVAC System Preparation

.1 Services Openings:
- .1 Access duct cleaning work through existing or new service openings, allowing safe access and thorough cleaning throughout specified components.
- .2 Work through service openings sized to allow mechanical tool entry and visual inspection, as required for cleaning activities.
- .3 Where possible, work through existing service openings.
- .4 Where new service openings are required, install openings as follows:
  - .1 Do not degrade structural, thermal, or functional system integrity, and comply with applicable SMACNA duct construction methods.
  - .2 Install service openings complying with applicable UL and SMACNA standards, federal, state, and local code requirements, and requirements of Authorities Having Jurisdiction.
  - .3 Where required, install duct access doors and service panels fabricated with materials complying with SMACNA and UL 723.
  - .4 Where required, install tapes and mastics complying with UL 181A/B.
  - .5 Where required, install closure panels fabricated from equivalent material and same or heavier gage.
  - .6 Mechanically fasten closure panels over service openings with screws or rivets at perimeter, maximum [4 inches] [100mm] spacing.
  - .7 Fabricate closure panel to overlap duct opening perimeter, minimum [1 inch] [25mm].
  - .8 Insulate closure panels to match adjacent duct interior and exterior surfaces.
  - .9 Seal rigid fibrous glass duct systems in accordance with NAIMA recommended practices.
    - .1 Install closure techniques: UL Standard 181 or UL Standard 181A.
  - .10 Close service openings installed in rigid fibrous glass ductwork and metal ductwork with fibrous glass liner with no exposed fibrous glass edges exposed to airstream.

.5 Install service openings that can be reopened for future inspection or remediation:
  .1 Mark outside of duct and report service opening locations to Owner in project closeout documents.
.6 Do not cut service openings into flexible duct:
  .1 Disconnect flexible duct at both ends as required for inspection and cleaning.
  .2 Reconnect flexible duct ends in accordance with SMACNA standards.

3.5 Cleaning Equipment Maintenance and Use

.1 Maintain equipment employed in work performance in good working order, consistent with equipment manufacturer's written instructions and applicable jurisdictional requirements.

.2 Clean and inspect equipment before bringing to work site.

.3 Do not introduce contaminants from cleaning equipment into indoor environment or HVAC system.

.4 Service equipment to limit possible HVAC system contamination from insufficient service equipment cleaning, and unsafe operating conditions for service personnel and building occupants.

.5 Perform activities requiring opening contaminated vacuum collection equipment on-site, including servicing or filter maintenance, in appropriate containment area or outside building.

.6 Clean and seal collection devices, vacuums and other tools and devices before relocating to different building areas, moving equipment through occupied spaces, and before removing equipment from building.

.7 Locate fuel-powered equipment to prevent combustion emissions and air exhaust emissions from entering building envelope:
  .1 Monitor and manage equipment operation and location to prevent introduction of combustion emissions into occupied space.

.8 Furnish HEPA-filtered equipment with minimum collection efficiency of 99.97 percent at 0.3 micron particle size, when vacuum collection equipment exhausts within building envelope.

3.6 Cleaning - General

.1 Perform HVAC system cleaning in accordance with ACR, The NADCA Standard.

.2 Remove visible non-adhered substances:
  .1 Clean HVAC components employing agitation device to dislodge contaminants from HVAC component airside surfaces and then capturing contaminants with vacuum collection device.

.1 Acceptable methods include those that do not damage integrity of ductwork and other system components and does not damage porous surface materials including internal insulation and duct lining.

.2 Clean HVAC components using source removal mechanical cleaning methods designed to extract contaminants from within HVAC system components and safely remove contaminants from facility.

.3 Select source removal methods rendering HVAC system components visibly clean and capable of passing cleanliness verification methods as described in ACR, The NADCA Standard.

.4 Do not employ cleaning method, or combination of methods, that can damage HVAC system components or negatively alter system integrity.

.5 Do not damage HVAC system and components with wet cleaning, power washing, steam cleaning and other wet process cleaning.

.3 Apply cleaning materials in accordance with manufacturer's instructions:

.1 Do not apply cleaning agents or water to electrical, fibrous glass or other porous HVAC system components.

.4 Capture removed contamination and cleaning materials and legally dispose.

.5 Verify HVAC system surface and component cleanliness in accordance with ACR, The NADCA Standard.

.6 Particulate Collection:

.1 Employ contaminant removal methods incorporating vacuum collection devices operated continuously during cleaning.

.1 Connect vacuum collection device to component being cleaned through service opening.

.2 Employ vacuum collection device of sufficient capacity to maintain areas being cleaned under negative pressure, containing debris and preventing contaminant migration to adjacent areas.

.2 When possible, discharge ducted exhaust air from vacuum collection devices outdoors, keeping discharge air clear of outdoor air intakes, operable windows, and other locations allowing outdoor air entry.

.1 Do not violate outdoor environmental standards, codes or regulations.

.2 Do not discharge unfiltered air from vacuum collection devices outdoors.

.3 When necessary to exhaust vacuum collection devices indoors, including hand-held and wet-vacuum machines, keep discharge air in work area, and provide machine air discharge HEPA filtration, rated at 99.97 percent collection efficiency for 0.3 micron particles and larger.

3.7 Air Duct Systems

.1 Clean airside surfaces of ducts to remove non-adhered substances.

.2 Access air duct interiors through service openings in system that are large enough to accommodate mechanical cleaning procedures and allow for cleanliness verification.

.3 Use mechanical agitation methods to remove non-adhered substances.

.4 Capture dislodged substances with vacuum collection device.

.5 Do not employ cleaning methods that damage HVAC components.

.6 Mark position of dampers and air-directional mechanical devices inside HVAC system prior to cleaning.

.7 When cleaning is complete, restore dampers and devices to their marked positions.

.8 After cleaning, verify cleanliness of HVAC system surfaces and components in accordance with ACR, The NADCA Standard.

3.8 Field Quality Control

.1 Inspect work to verify cleanliness immediately after HVAC system component cleaning and prior to placing system in operation.

.2 Do not apply treatment, coating, or antimicrobial agent to cleaned HVAC system components until the work has been inspected and determined to be acceptable.

.3 Visual Inspection:
- .1 When cleaning is complete, perform final inspection in presence of the Consultant.
- .2 Perform visual inspection of porous and non-porous HVAC system component surfaces. Verify HVAC system components are visibly clean as defined in ACR, The NADCA Standard.
- .3 If no contaminants are evident through visual inspection, HVAC system components are considered clean and acceptable.
- .4 If contaminants are evident through visual inspection, repeat cleaning system areas where contaminants are visible.

.4 NADCA Vacuum Test for Non-Porous Surfaces Only:
- .1 When required, perform Vacuum Test in presence of the Consultant and in accordance with ACR, The NADCA Standard.
- .2 Apply NADCA Vacuum Test template to ducted airside of component's surface.
- .3 Attach closed-face vacuum cassette with filter media to calibrated air sampling pump and pass closed-face of filter cassette over two 2 cm x 25 cm openings marked on template.
- .4 The cassette shall be moved at a rate not greater than 5 cm per second (5 seconds per slot in each direction).When sampling is complete, prepare filter cassette and weigh it to determine total amount of debris collected.
- .5 Surface is considered acceptably clean, when net weight of debris collected on filter cassette is less than 0.75 mg/100 cm^2.

3.9 System Startup

.1 Install closures over services access openings before allowing system restart for normal facility operation.

.2 When system is placed in operation, remove temporary filter elements after minimum 24 hours operation.

3.10 Disposal of Job Site Duct Cleaning Waste

.1 Seal HVAC system debris and removed contaminated materials in containers before removal from work area.

.2 Handle materials classified as hazardous by governmental agencies in accordance with applicable federal, state, and local, regulations and codes.

.3 Dispose of debris removed from HVAC system in accordance with applicable federal, state, and local requirements.

END OF SECTION

Drawings

DRAWING LIST

BR0.0	TITLE PAGE
BR1.0	PROPERTY AERIAL VIEW AND SITE PLAN
BR1.1	OVERALL ROOF PLAN
BR2.0	ENLARGED ROOF PLAN
BR2.1	ENLARGED REFLECTED CEILING PLAN
BR3.0	EXISTING CONDITIONS PHOTOS
BR3.1	EXISTING CONDITIONS PHOTOS
BR4.0	STRUCTURAL ROOF DEMOLITION PLAN
BR4.1	STRUCTURAL ROOF FRAMING PLAN
BR4.2	STRUCTURAL WIND LOAD DIAGRAM
BR5.0	STRUCTURAL SECTIONS
BR5.1	SECTION DETAILS
BR5.2	SECTION DETAILS
BR5.3	SECTION DETAILS
BR5.4	SECTION DETAILS

Client Logo:

NOTE TO CONTRACTOR:
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Issued for Tender	C	2025/03/14
Issued for Review	B	2025/03/12
Issued for Review	A	2025/02/03

MTE
Engineers, Scientists, Surveyors
905-639-2552

NOTE: THE UNDERSIGNED HAS REVIEWED AND TAKES RESPONSIBILITY FOR THIS DESIGN, AND HAS THE QUALIFICATIONS AND MEETS THE REQUIREMENTS SET OUT IN THE ONTARIO BUILDING CODE TO BE A DESIGNER

Seal:

PROJECT
GABRIELLE ROY ELEMENTARY SCHOOL ROOF REPLACEMENT
14 PEMBROKE ST TORONTO, ON

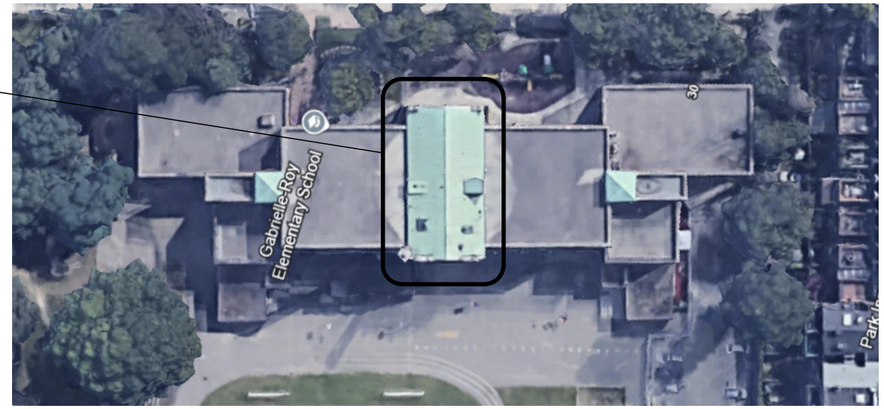
DRAWING
TITLE PAGE

Project Number:	56150-100
Scale:	N.A.
Date:	March 14, 2025
Project Manager:	AMB
Designed By:	AMB
Drawn By:	TT
Checked By:	JXS

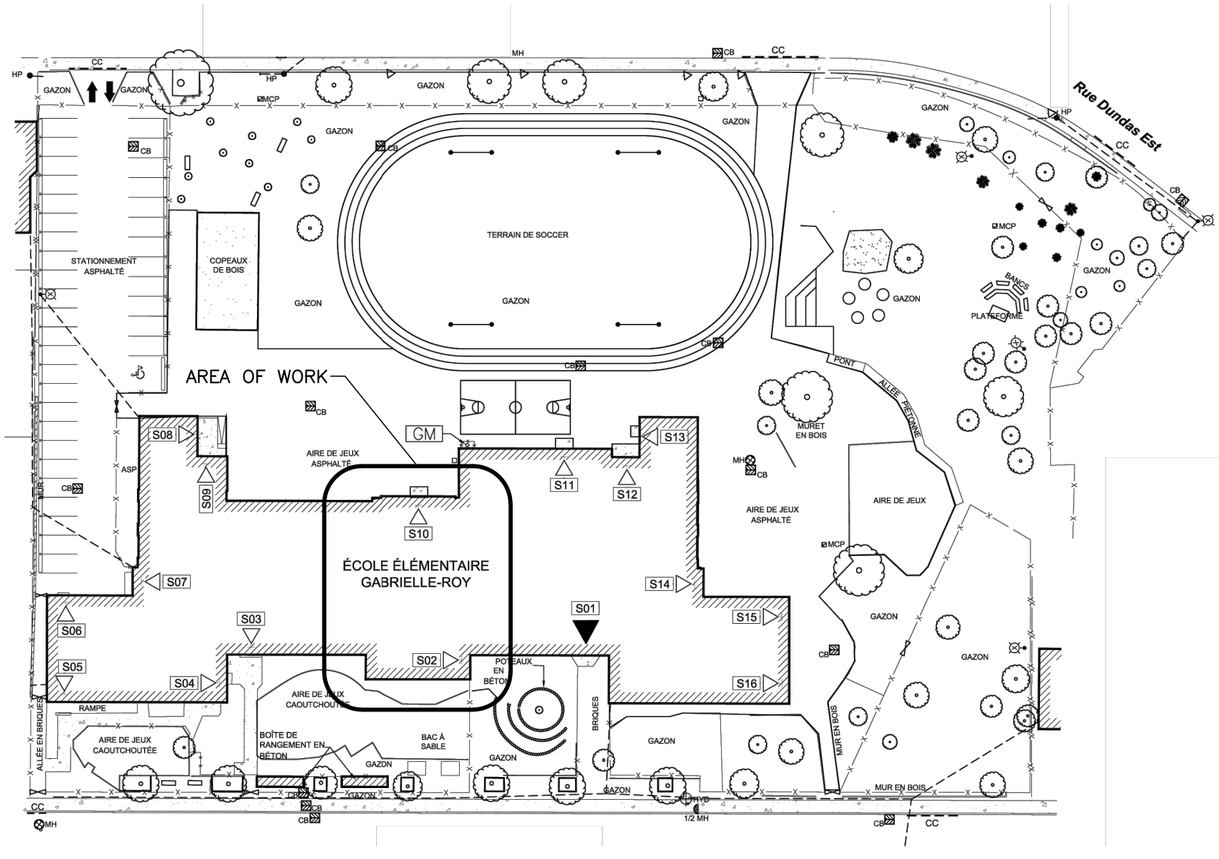
Drawing Number: **BR0.0**

SIZE: 11x17 CAD: P:\56150\100\WORKING\56150-100 GABRIELLE ROY BR1.0.DWG

AREA OF WORK



1 BR1.0 **AERIAL VIEW** N.T.S.



2 BR1.0 **SITE PLAN** N.T.S.

EXISTING PLAN OBTAINED FROM DRAWINGS PREPARED BY SARNIA BRIDGE COMPANY DATED 1929.

Client Logo:

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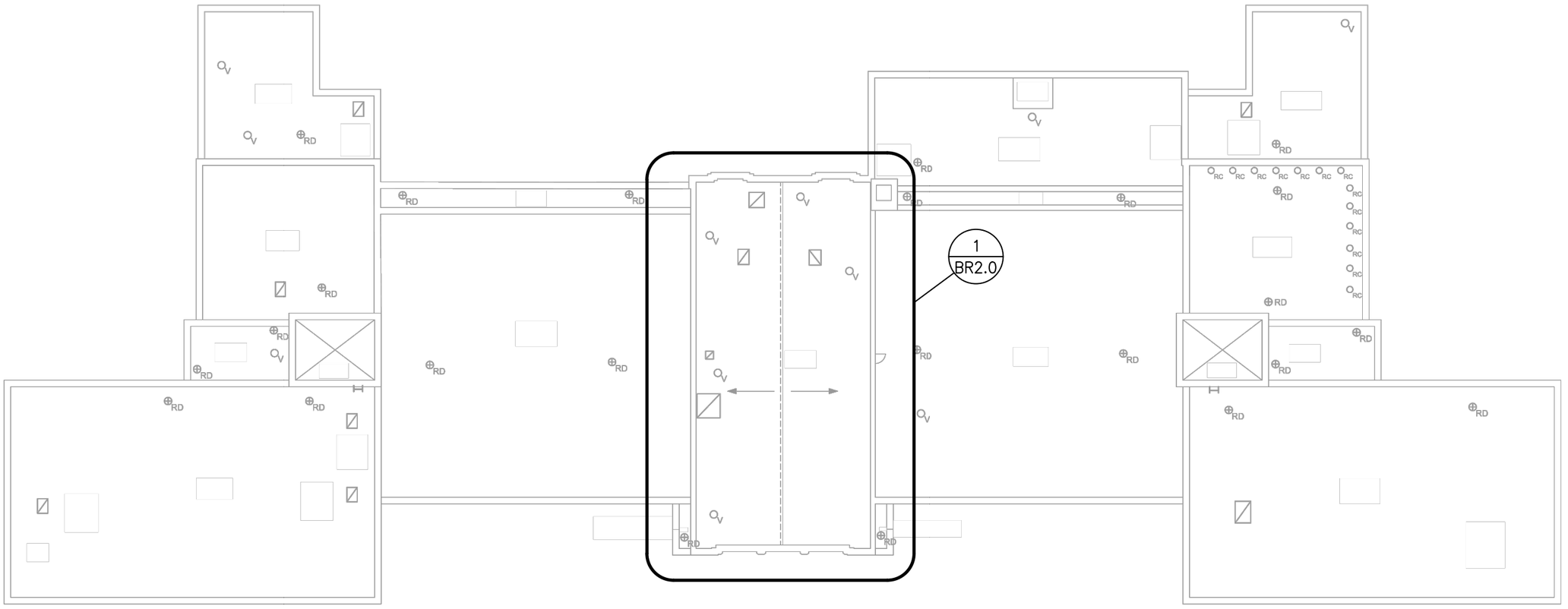
GABRIELLE ROY ELEMENTARY SCHOOL ROOF REPLACEMENT
14 PEMBROKE ST TORONTO, ON

DRAWING
PROPERTY AERIAL VIEW AND SITE PLAN

Project Number:	56150-100
Scale:	N.T.S.
Date:	March 14, 2025
Project Manager:	AMB
Designed By:	AMB
Drawn By:	TT
Checked By:	JXS

Drawing Number: **BR1.0**



1 / BR1.1 ROOF PLAN
N.T.S.

LEGEND

- DENOTES EX. EXHAUST FAN
- DENOTES EX. PIPE
- DENOTES EX. ROOF ANCHOR
- DENOTES EX. SKYLIGHT
- DENOTES EX. DOWNSPOUT AND EAVESTROUGH
- DENOTES NEW DOWNSPOUT AND EAVESTROUGH

EXISTING PLAN OBTAINED FROM DRAWINGS PREPARED BY SARNIA BRIDGE COMPANY DATED 1929.

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Seal:

PROJECT
GABRIELLE ROY ELEMENTARY SCHOOL ROOF REPLACEMENT
14 PEMBROKE ST TORONTO, ON

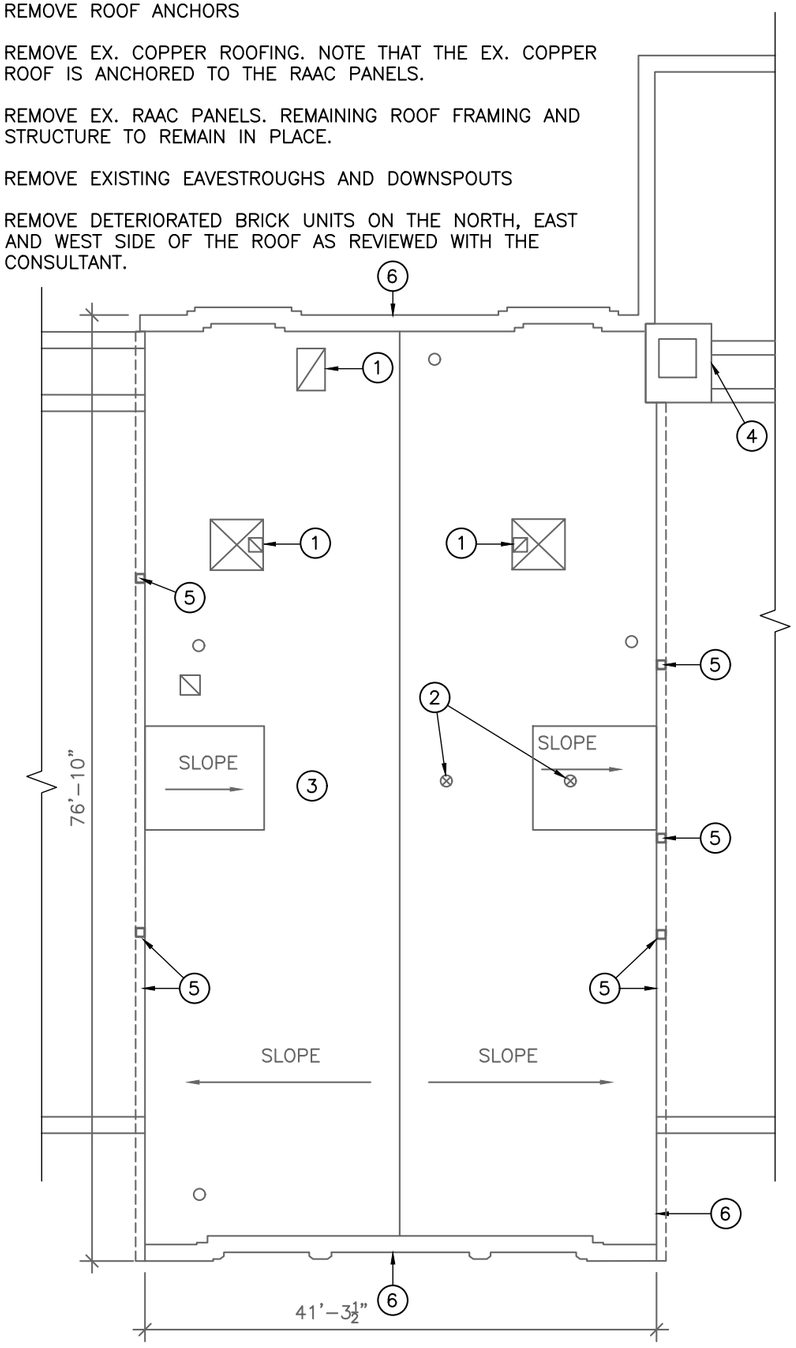
DRAWING
OVERALL ROOF PLAN

Project Number:	56150-100
Scale:	N.T.S.
Date:	March 14, 2025
Project Manager:	AMB
Designed By:	AMB
Drawn By:	TT
Checked By:	JXS

Drawing Number: BR1.1

EXISTING LAYOUT AND DEMOLITION NOTES:

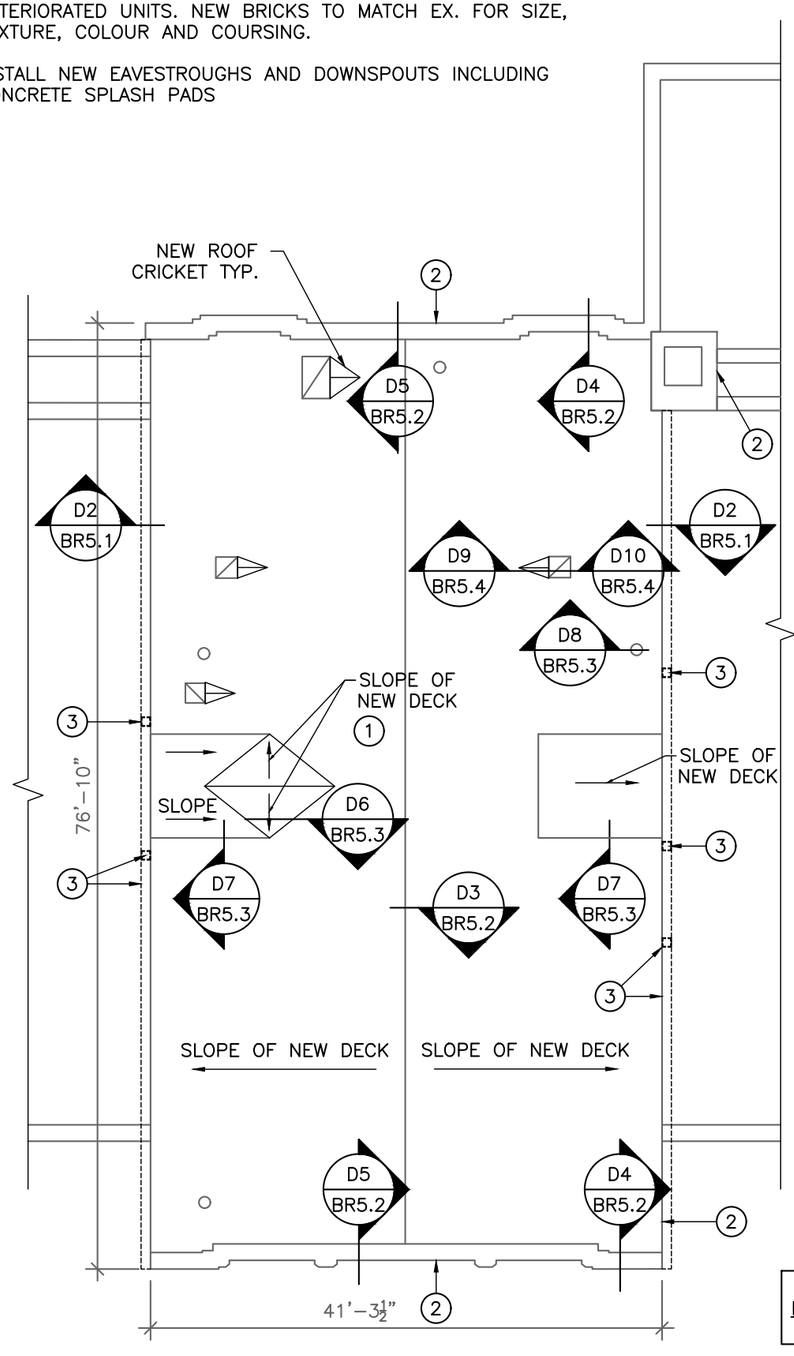
1. DISCONNECT AND TEMPORARILY REMOVE EX. EXHAUST FANS ATTACHED THE U/S OF EX. ROOF DECK. MAINTAIN EX. PIPING IN PLACE
2. REMOVE ROOF ANCHORS
3. REMOVE EX. COPPER ROOFING. NOTE THAT THE EX. COPPER ROOF IS ANCHORED TO THE RAAC PANELS.
4. REMOVE EX. RAAC PANELS. REMAINING ROOF FRAMING AND STRUCTURE TO REMAIN IN PLACE.
5. REMOVE EXISTING EAVESTROUGHS AND DOWNSPOUTS
6. REMOVE DETERIORATED BRICK UNITS ON THE NORTH, EAST AND WEST SIDE OF THE ROOF AS REVIEWED WITH THE CONSULTANT.



1 BR2.0 EXISTING ROOF PLAN
N.T.S.

CONSTRUCTION NOTES:

1. INSTALL NEW ROOF ASSEMBLY PER DETAIL D1/BR5.1
2. INSTALL NEW BRICK UNITS TO REPLACE THE PREVIOUSLY REMOVED DETERIORATED UNITS. NEW BRICKS TO MATCH EX. FOR SIZE, TEXTURE, COLOUR AND COURSING.
3. INSTALL NEW EAVESTROUGHS AND DOWNSPOUTS INCLUDING CONCRETE SPLASH PADS



2 BR2.0 ROOF CONSTRUCTION PLAN
N.T.S.

LEGEND

- DENOTES EX. EXHAUST FAN
- DENOTES EX. PIPE
- DENOTES EX. ROOF ANCHOR
- DENOTES EX. SKYLIGHT
- DENOTES EX. DOWNSPOUT AND EAVESTROUGH
- DENOTES NEW DOWNSPOUT AND EAVESTROUGH

ALL DIMENSIONS, ROOF PENETRATIONS AND EQUIPMENT TO BE SITE VERIFIED

EXISTING PLAN OBTAINED FROM DRAWINGS PREPARED BY SARNIA BRIDGE COMPANY DATED 1929.

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Seal:

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GABRIELLE ROY ELEMENTARY SCHOOL ROOF REPLACEMENT
14 PEMBROKE ST TORONTO, ON

DRAWING
ENLARGED ROOF PLAN

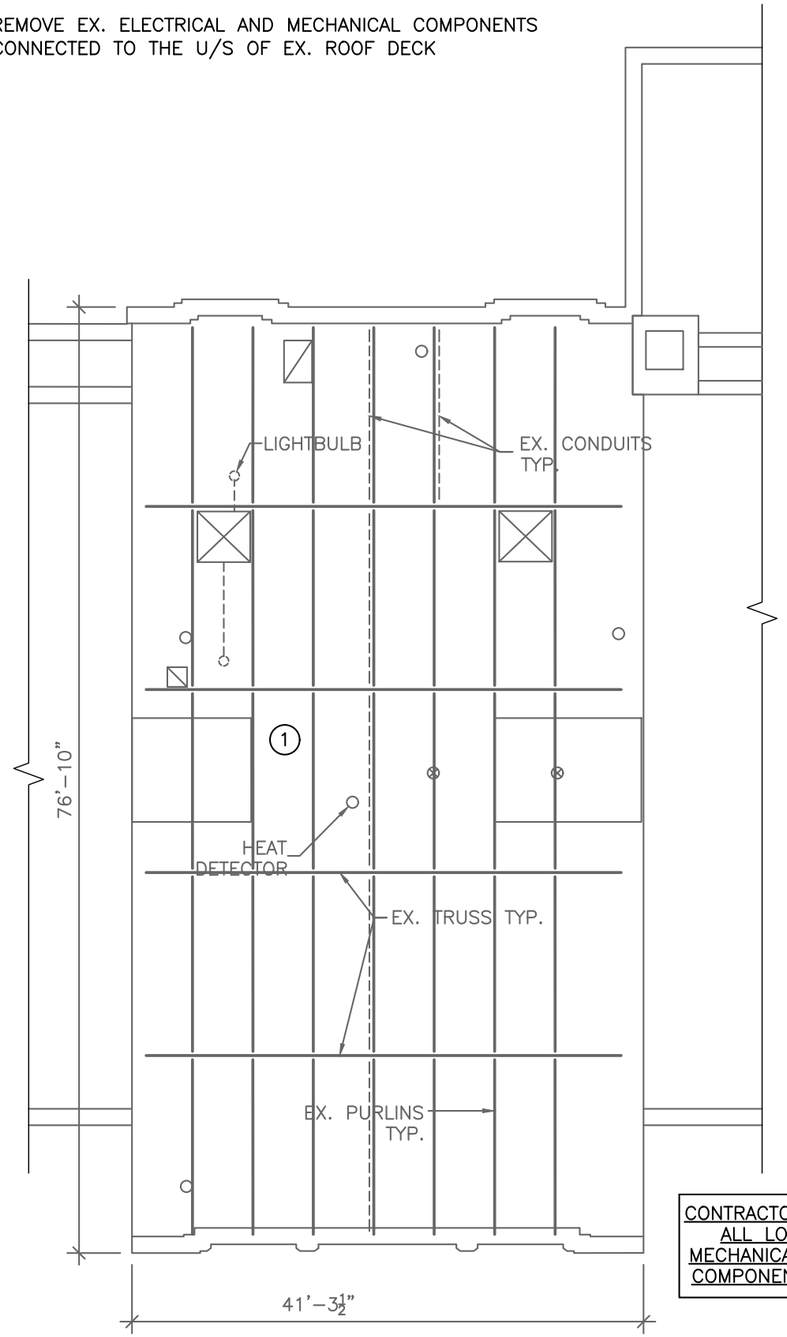
Project Number:	56150-100
Scale:	N.T.S.
Date:	March 14, 2025
Project Manager:	AMB
Designed By:	AMB
Drawn By:	TT
Checked By:	JXS

Drawing Number: BR2.0

SIZE: 11x17 CAD: P:\56150\100\WORKING\56150-100 GABRIELLE ROY BR1.0.DWG

EXISTING LAYOUT AND DEMOLITION NOTES:

1. REMOVE EX. ELECTRICAL AND MECHANICAL COMPONENTS CONNECTED TO THE U/S OF EX. ROOF DECK

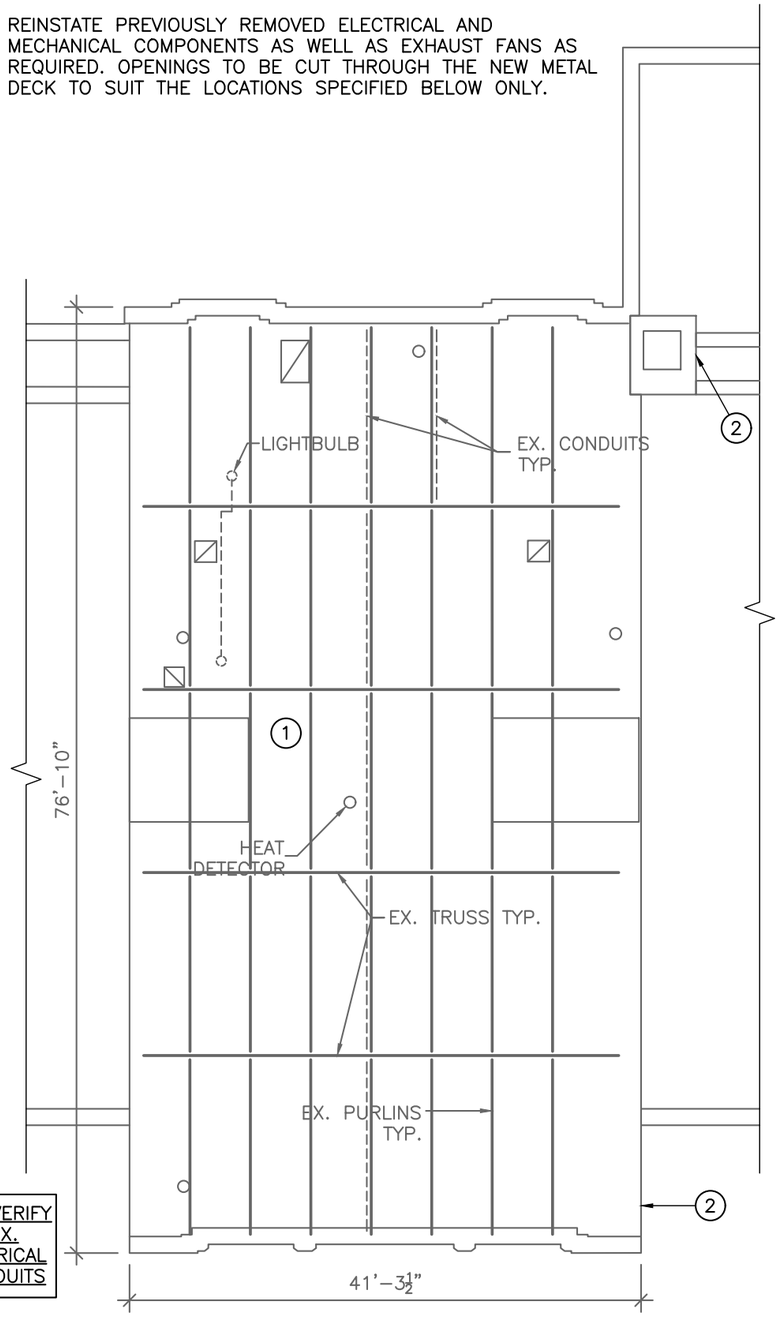


1/BR2.0 EXISTING REFLECTED CEILING PLAN
N.T.S.

CONTRACTOR TO FIELD VERIFY ALL LOCATIONS OF EX. MECHANICAL AND ELECTRICAL COMPONENTS AND CONDUITS

CONSTRUCTION NOTES:

1. REINSTATE PREVIOUSLY REMOVED ELECTRICAL AND MECHANICAL COMPONENTS AS WELL AS EXHAUST FANS AS REQUIRED. OPENINGS TO BE CUT THROUGH THE NEW METAL DECK TO SUIT THE LOCATIONS SPECIFIED BELOW ONLY.



2/BR2.0 REFLECTED CEILING CONSTRUCTION PLAN
N.T.S.

LEGEND

- DENOTES EX. EXHAUST FAN
- DENOTES EX. PIPE
- DENOTES EX. ROOF ANCHOR
- DENOTES EX. SKYLIGHT
- DENOTES EX. DOWNSPOUT AND EAVESTROUGH
- DENOTES NEW DOWNSPOUT AND EAVESTROUGH

ALL DIMENSIONS TO BE SITE VERIFIED

EXISTING PLAN OBTAINED FROM DRAWINGS PREPARED BY SARNIA BRIDGE COMPANY DATED 1929.

Client Logo:

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Issued for Tender	C	2025/03/14
Issued for Review	B	2025/03/12
Issued for Review	A	2025/02/03

MTE
Engineers, Scientists, Surveyors
905-639-2552

NOTE: THE UNDERSIGNED HAS REVIEWED AND TAKES RESPONSIBILITY FOR THIS DESIGN, AND HAS THE QUALIFICATIONS AND MEETS THE REQUIREMENTS SET OUT IN THE ONTARIO BUILDING CODE TO BE A DESIGNER

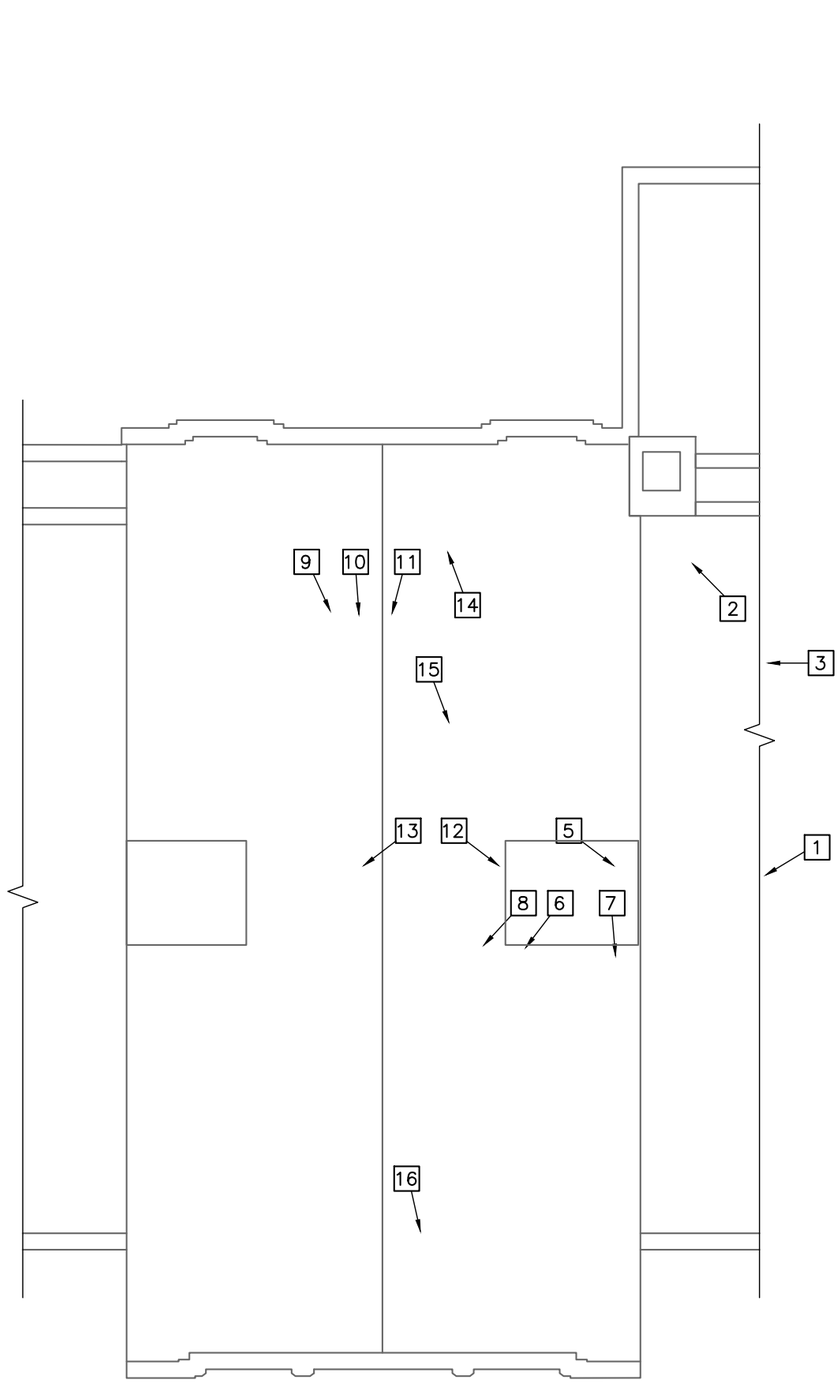
Seal:

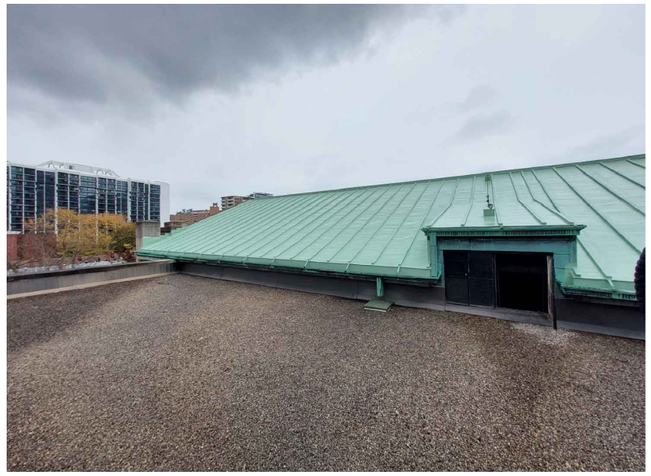
PROJECT
GABRIELLE ROY ELEMENTARY SCHOOL ROOF REPLACEMENT
14 PEMBROKE ST TORONTO, ON

DRAWING
ENLARGED REFLECTED CEILING PLANS

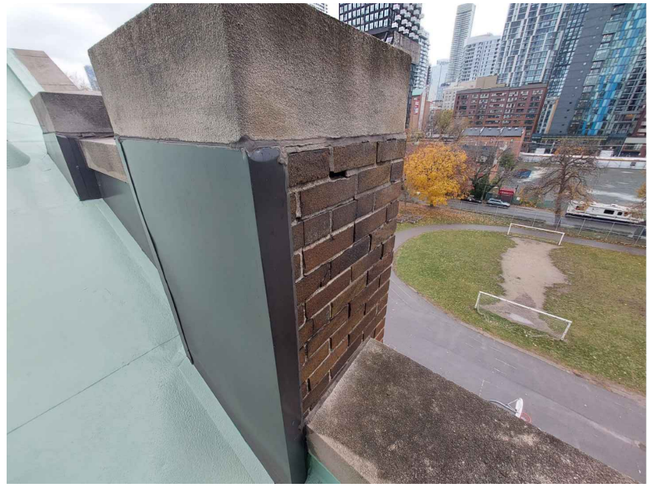
Project Number:	56150-100
Scale:	N.T.S.
Date:	March 14, 2025
Project Manager:	AMB
Designed By:	AMB
Drawn By:	TT
Checked By:	JXS

Drawing Number: BR2.1





1. PARTIAL NORTH VIEW OF SLOPED ROOF



2. PARTIAL VIEW OF SLOPED ROOF PARAPET

3. NORTH VIEW OF SLOPED ROOF

Client Logo:

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Seal:

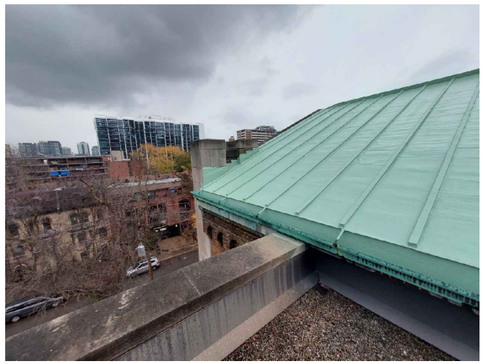
PROJECT
GABRIELLE ROY ELEMENTARY SCHOOL ROOF REPLACEMENT
14 PEMBROKE ST TORONTO, ON

DRAWING
EXISTING CONDITIONS PHOTOS

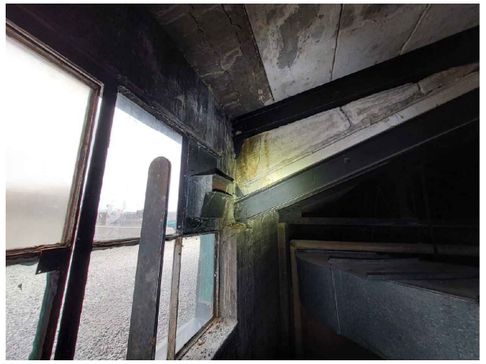
Project Number:	56150-100
Scale:	N.T.S.
Date:	March 14, 2025
Project Manager:	AMB
Designed By:	AMB
Drawn By:	TT
Checked By:	JXS

Drawing Number: BR3.0

SIZE: 11x17 CAD: P:\56150\100\WORKING\56150-100 GABRIELLE ROY BR1.0.DWG

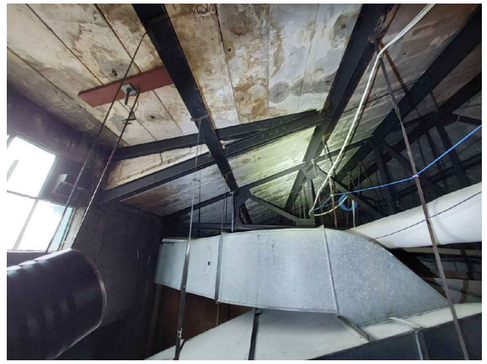


4. EAST END OF SLOPED ROOF

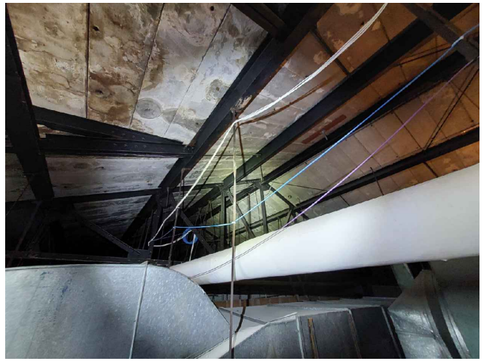


5. ROOF FRAMING AT NORTH WALL

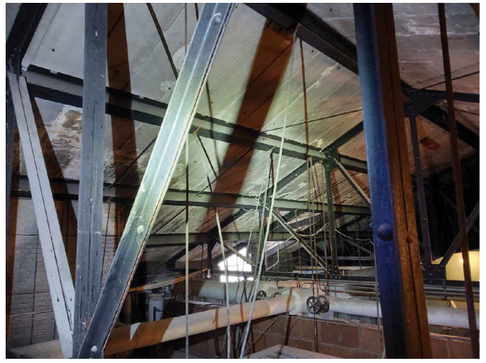
6. ROOF METAL (TRUSSES) AND FRAMING



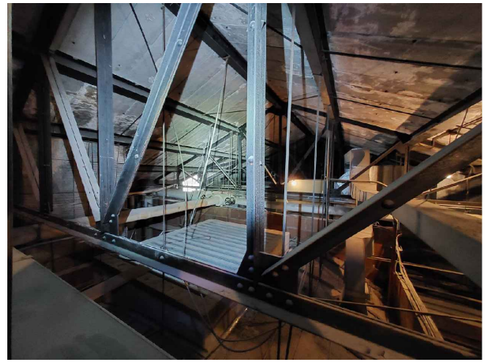
7. RAAC ROOF PANELS



8. MECHANICAL DUCTWORK AND ELECTRICAL CONDUIT IN THE ATTIC

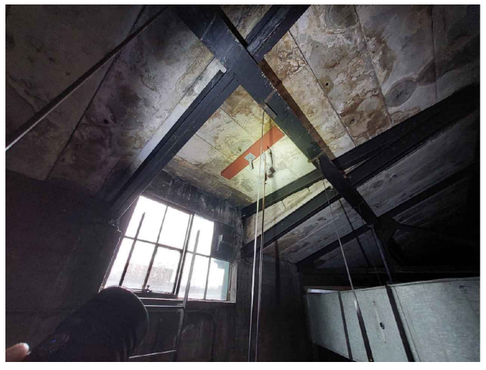


9. ATTIC SPACE BELOW SLOPED ROOF

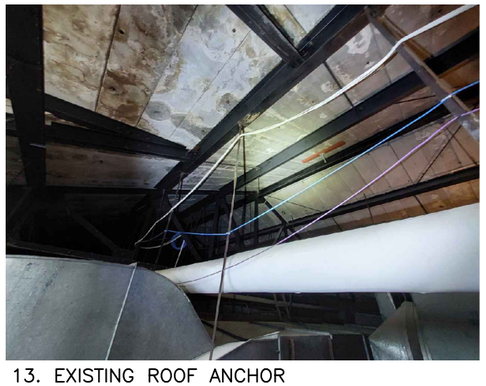


10. ATTIC SPACE BELOW SLOPED ROOF

11. SLOPED ROOF METAL TRUSSES



12. EXISTING ROOF ANCHOR



13. EXISTING ROOF ANCHOR

14. WEST VIEW OF SLOPED ROOF

15. SOUTHWEST VIEW OF SLOPED ROOF

16. SOUTH VIEW OF SLOPED ROOF

Client Logo:

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905-639-2552

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Seal:

PROJECT
GABRIELLE ROY ELEMENTARY SCHOOL ROOF REPLACEMENT
14 PEMBROKE ST TORONTO, ON

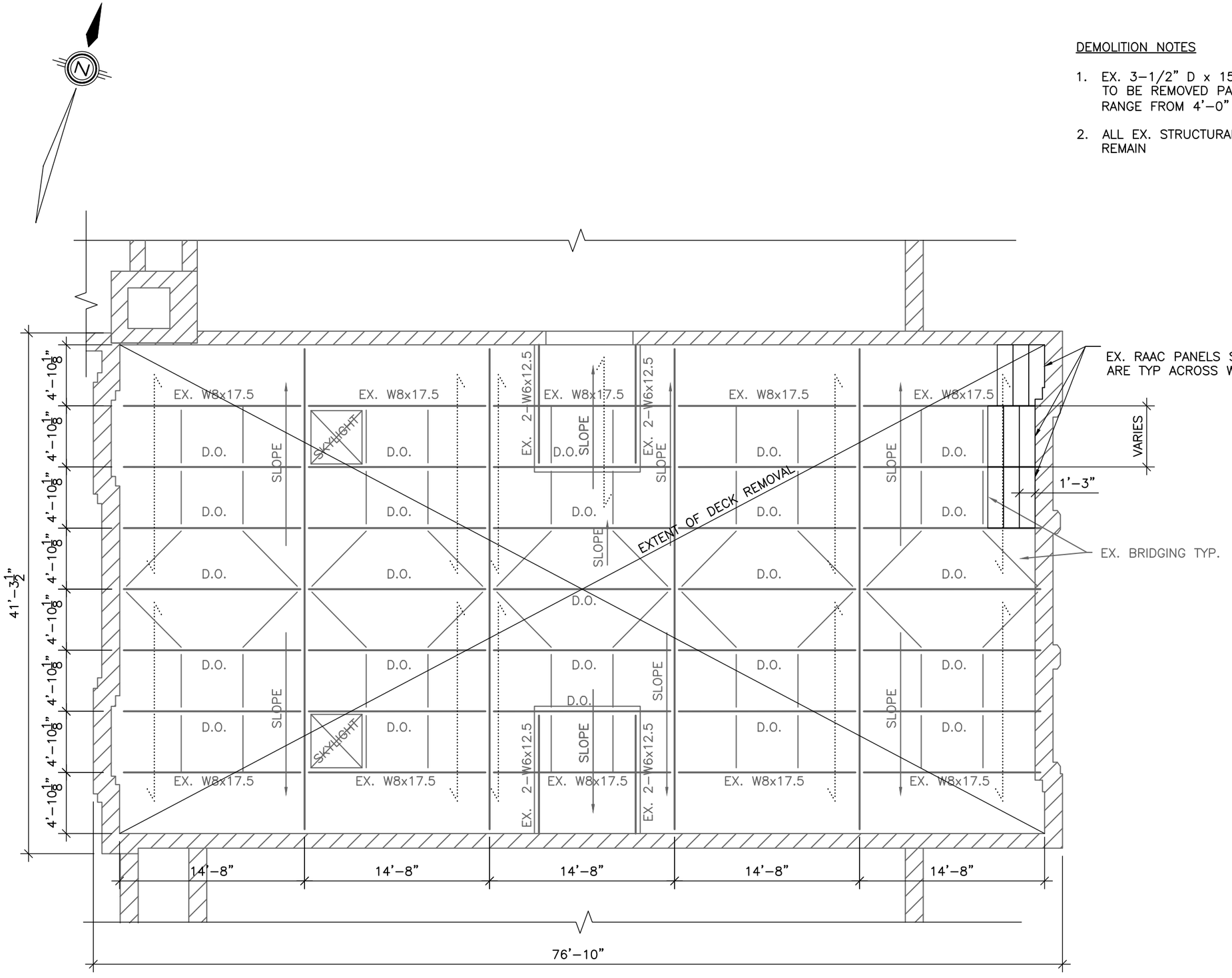
DRAWING
EXISTING CONDITIONS PHOTOS

Project Number:	56150-100
Scale:	N.T.S.
Date:	March 14, 2025
Project Manager:	AMB
Designed By:	AMB
Drawn By:	TT
Checked By:	JXS

Drawing Number: BR3.1

DEMOLITION NOTES

1. EX. 3–1/2" D x 15" W RAAC PANELS TO BE REMOVED PANEL LENGTHS RANGE FROM 4'–0" TO 5'–0"
2. ALL EX. STRUCTURAL FRAMING TO REMAIN



EXISTING PLAN OBTAINED FROM DRAWINGS PREPARED BY SARNIA BRIDGE COMPANY DATED 1929.

Client Logo:

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Seal:

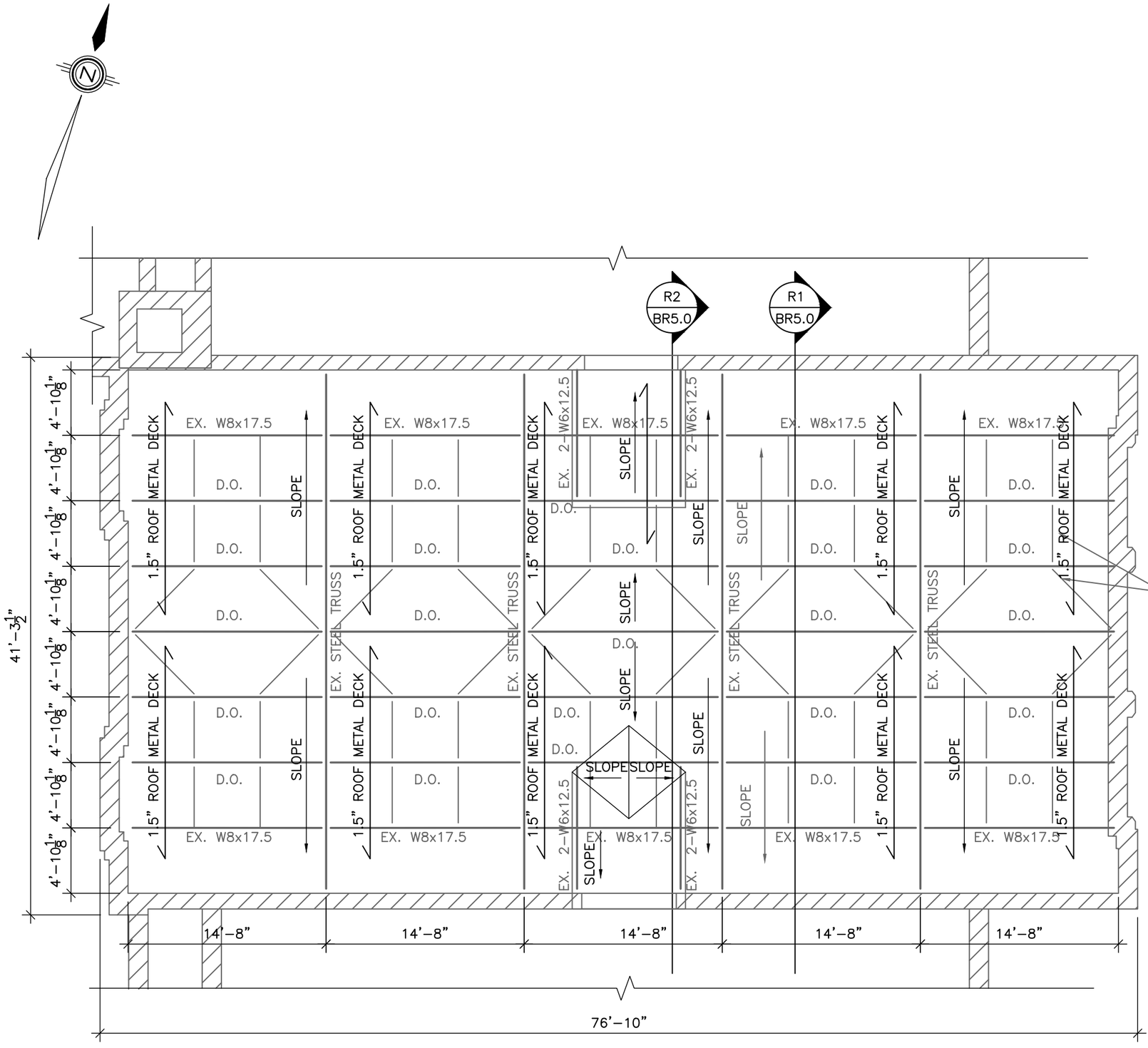
PROJECT
GABRIELLE ROY ELEMENTARY SCHOOL ROOF REPLACEMENT
14 PEMBROKE ST TORONTO, ON

DRAWING
STRUCTURAL ROOF DECK DEMOLITION PLAN

Project Number:	56150-100
Scale:	1/8"=1'-0"
Date:	March 14, 2025
Project Manager:	AMB
Designed By:	AMB
Drawn By:	TT
Checked By:	JXS

Drawing Number: **BR4.0**

SIZE: 11x17 CAD: P:\56150\100\WORKING\56150-100 GABRIELLE ROY BR1.0.DWG



ROOF LOADING
SNOW LOAD = 1.31 kPa
DEAD LOAD = 0.622 kPa

REFER TO BR 1.0 FOR CONSTRUCTION NOTES

EXISTING PLAN OBTAINED FROM DRAWINGS PREPARED BY SARNIA BRIDGE COMPANY DATED 1929.

Client Logo:

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Seal:

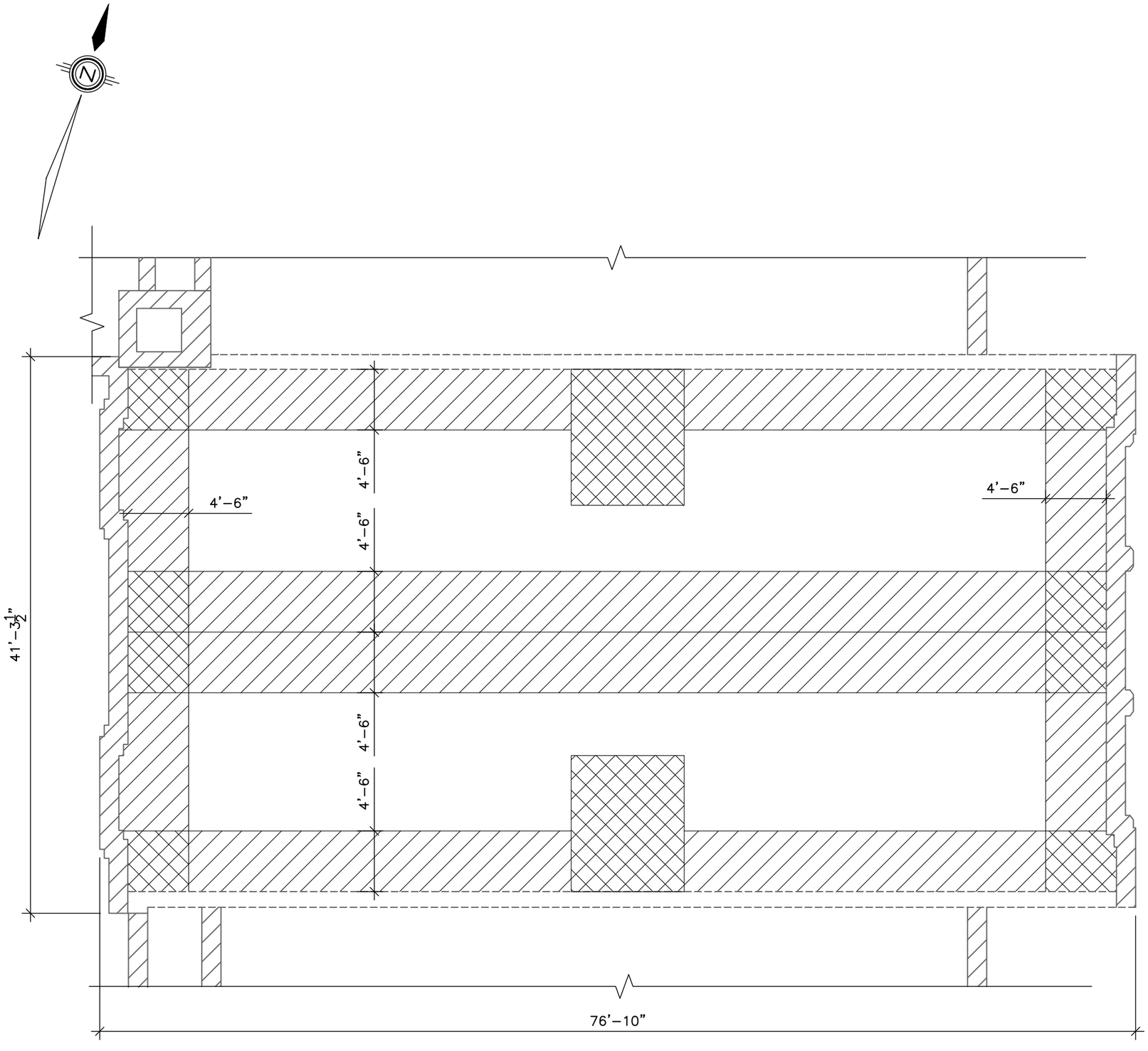
PROJECT
GABRIELLE ROY ELEMENTARY SCHOOL ROOF REPLACEMENT
14 PEMBROKE ST TORONTO, ON

DRAWING
EX. STRUCTURAL ROOF FRAMING AND NEW METAL DECK PLAN

Project Number:	56150-100
Scale:	1/8"=1'-0"
Date:	March 14, 2025
Project Manager:	AMB
Designed By:	AMB
Drawn By:	TT
Checked By:	JXS

Drawing Number: BR4.1

SIZE: 11x17 CAD: P:\56150\100\WORKING\56150-100 GABRIELLE ROY BR1.0.DWG



WIND LOAD

- 58 PSF
- 44 PSF
- 32 PSF

EXISTING PLAN OBTAINED FROM DRAWINGS PREPARED BY SARNIA BRIDGE COMPANY DATED 1929.

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Seal:

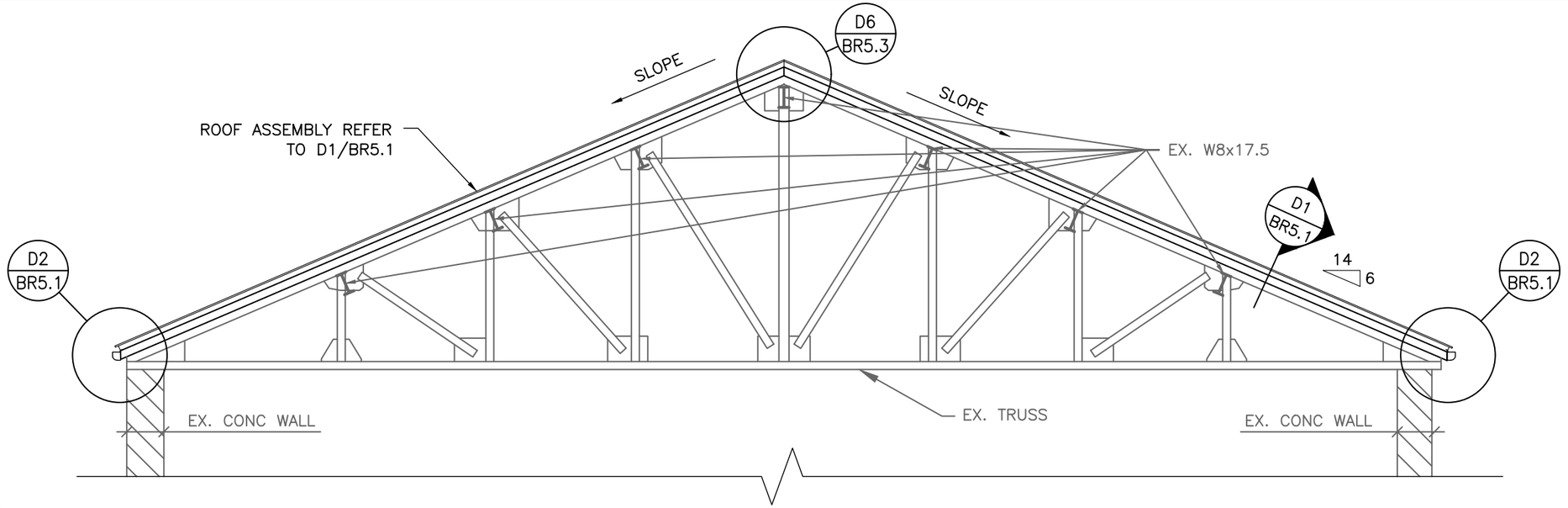
PROJECT
GABRIELLE ROY ELEMENTARY SCHOOL ROOF REPLACEMENT
14 PEMBROKE ST TORONTO, ON

DRAWING
STRUCTURAL WIND LOAD DIAGRAM

Project Number:	56150-100
Scale:	1/8"=1'-0"
Date:	March 14, 2025
Project Manager:	AMB
Designed By:	AMB
Drawn By:	TT
Checked By:	JXS

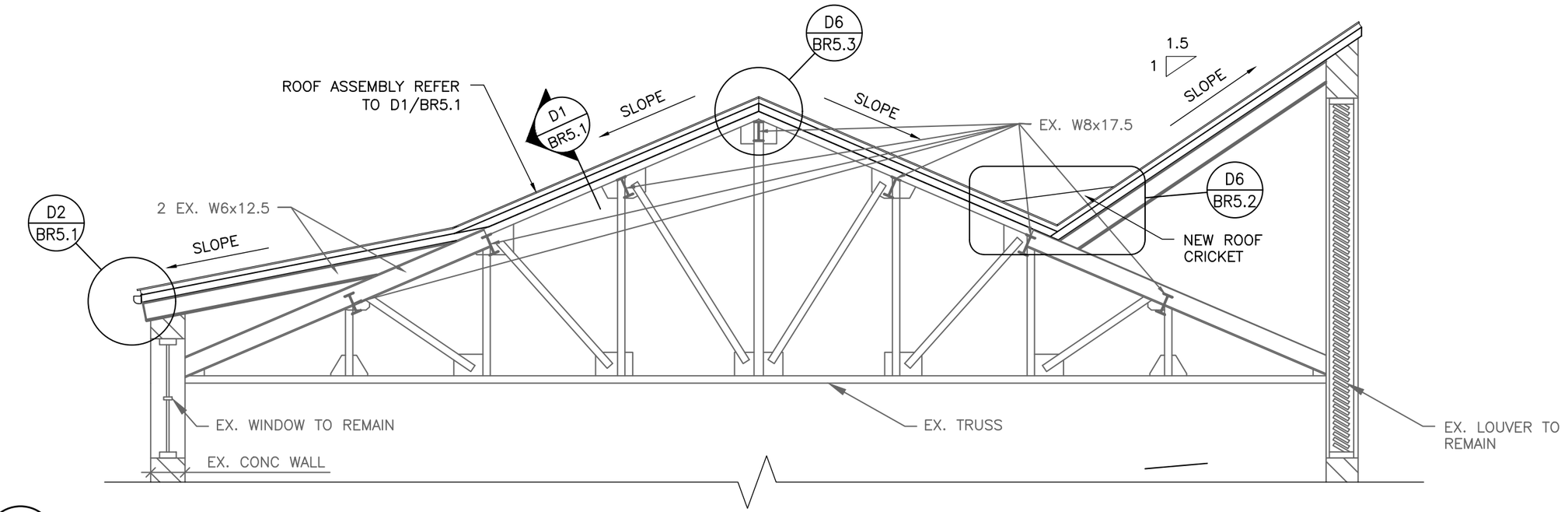
Drawing Number: BR4.2

SIZE: 11x17 CAD: P:\56150\100\WORKING\56150-100 GABRIELLE ROY BR1.0.DWG



R1 BR5.0 **ROOF SECTION**

SCALE 1'-0" = 1/4"



R2 BR5.0 **ROOF SECTION**

SCALE 1'-0" = 1/4"

SIZE: 11x17 CAD: P:\56150\100\WORKING\56150-100 GABRIELLE ROY BR1.0.DWG

Client Logo:

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Seal:

PROJECT
GABRIELLE ROY ELEMENTARY SCHOOL ROOF REPLACEMENT
14 PEMBROKE ST TORONTO, ON

DRAWING
STRUCTURAL SECTIONS

Project Number:	56150-100
Scale:	AS SHOWN
Date:	March 14, 2025
Project Manager:	AMB
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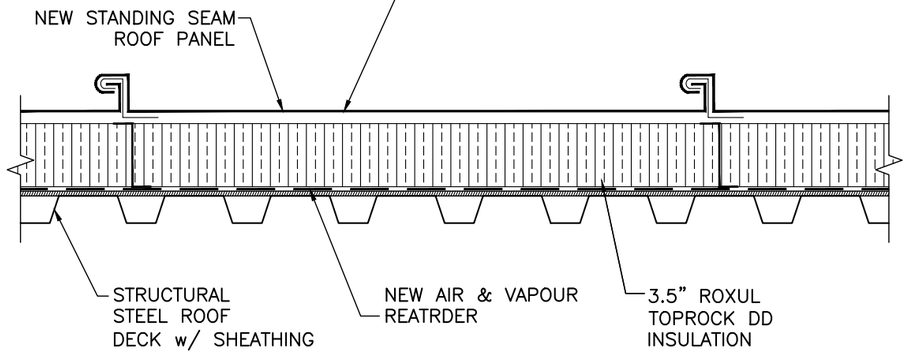
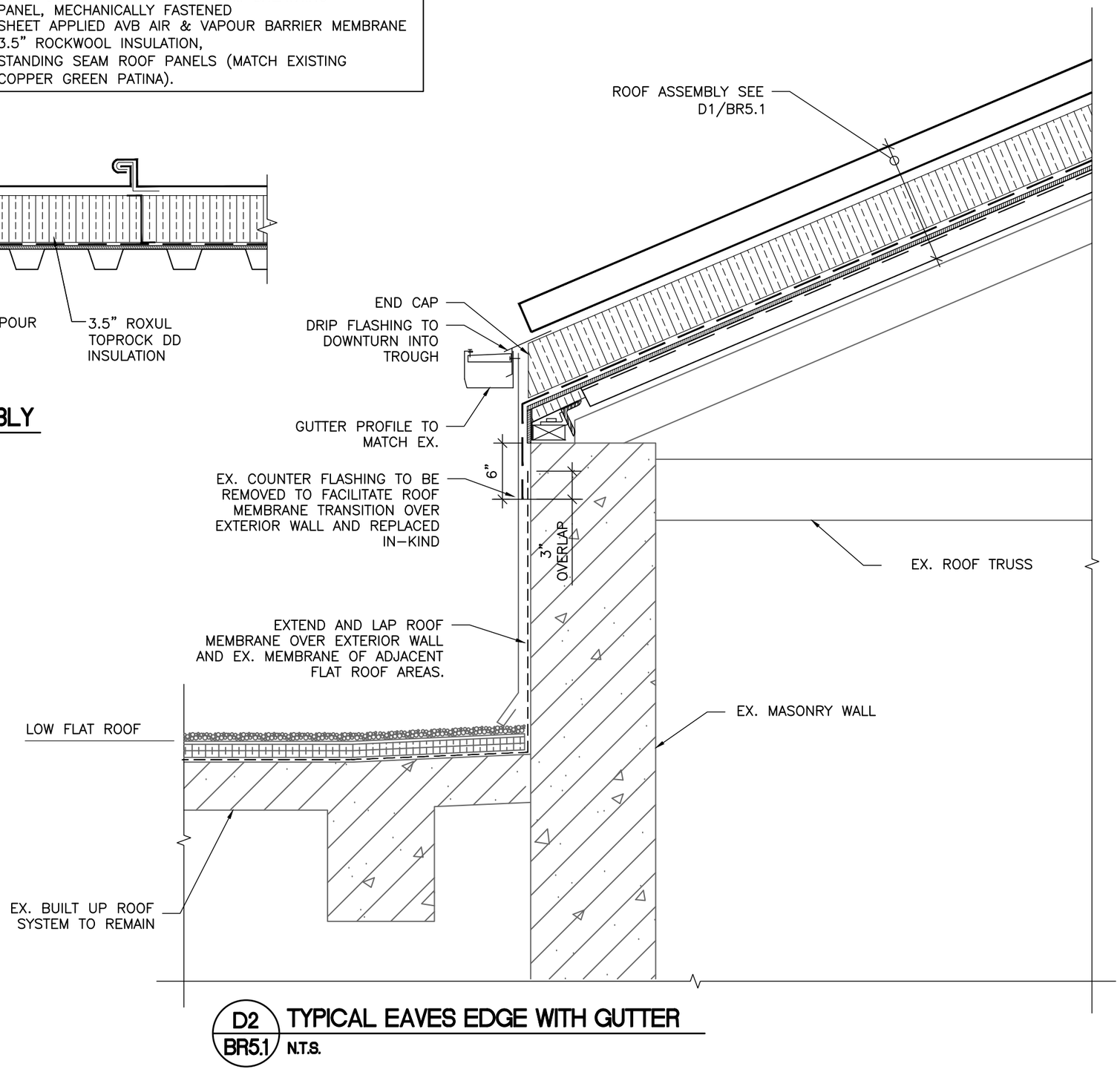
Drawn By:	TT
Checked By:	JXS

Drawing Number: BR5.0

ROOF ASSEMBLY (BOTTOM TO TOP)
.1 1.5" DEEP VICWEST METAL ROOF DECK
.2 13MM GLASS–MAT FACED GYPSUM SHEATHING PANEL, MECHANICALLY FASTENED
.3 SHEET APPLIED AVB AIR & VAPOUR BARRIER MEMBRANE
.4 3.5" ROCKWOOL INSULATION,
.5 STANDING SEAM ROOF PANELS (MATCH EXISTING COPPER GREEN PATINA).



D1 / BR5.1 TYP. ROOF ASSEMBLY N.T.S.



D2 / BR5.1 TYPICAL EAVES EDGE WITH GUTTER N.T.S.

SIZE: 11x17 CAD: P:\56150\100\WORKING\56150-100 GABRIELLE ROY BR1.0.DWG

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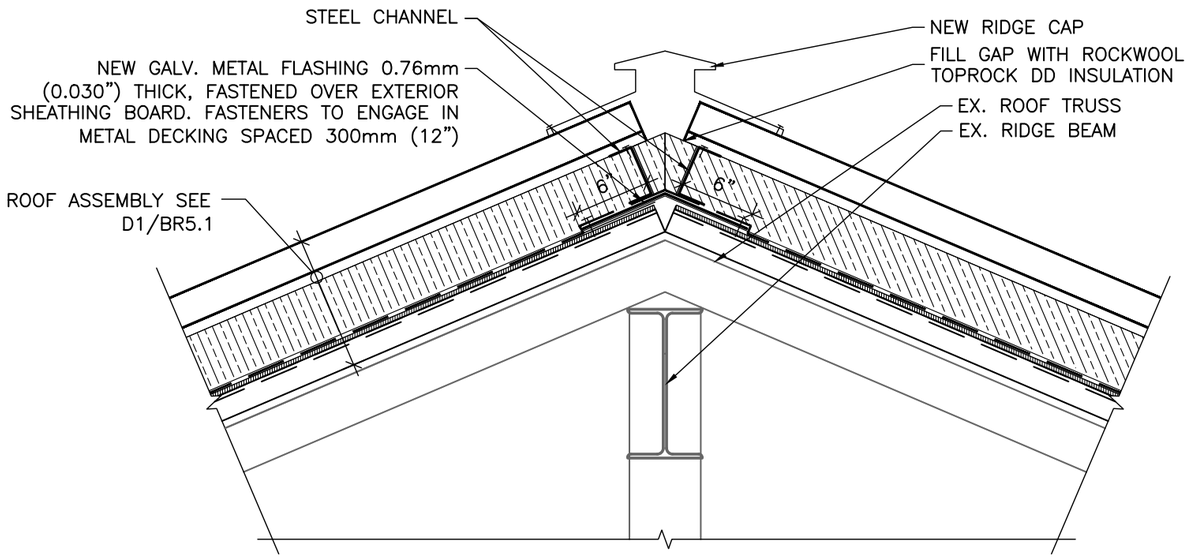
Seal:

PROJECT
GABRIELLE ROY ELEMENTARY SCHOOL ROOF REPLACEMENT
14 PEMBROKE ST TORONTO, ON

DRAWING
SECTION DETAILS

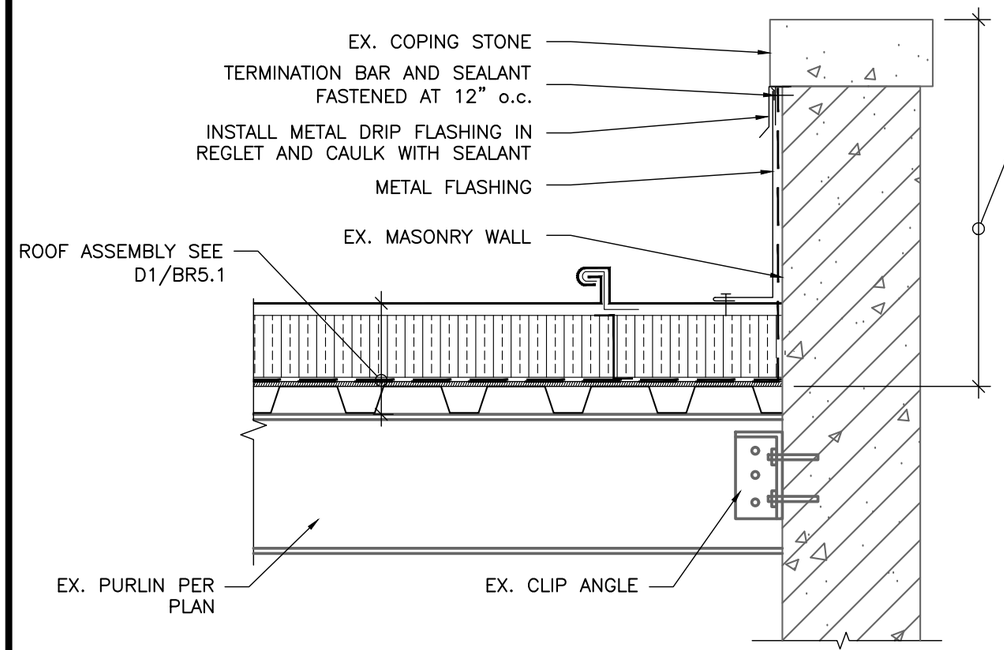
Project Number:	56150-100
Scale:	AS SHOWN
Date:	March 14, 2025
Project Manager:	AMB
Designed By:	AMB
Drawn By:	TT
Checked By:	JXS

Drawing Number: BR5.1



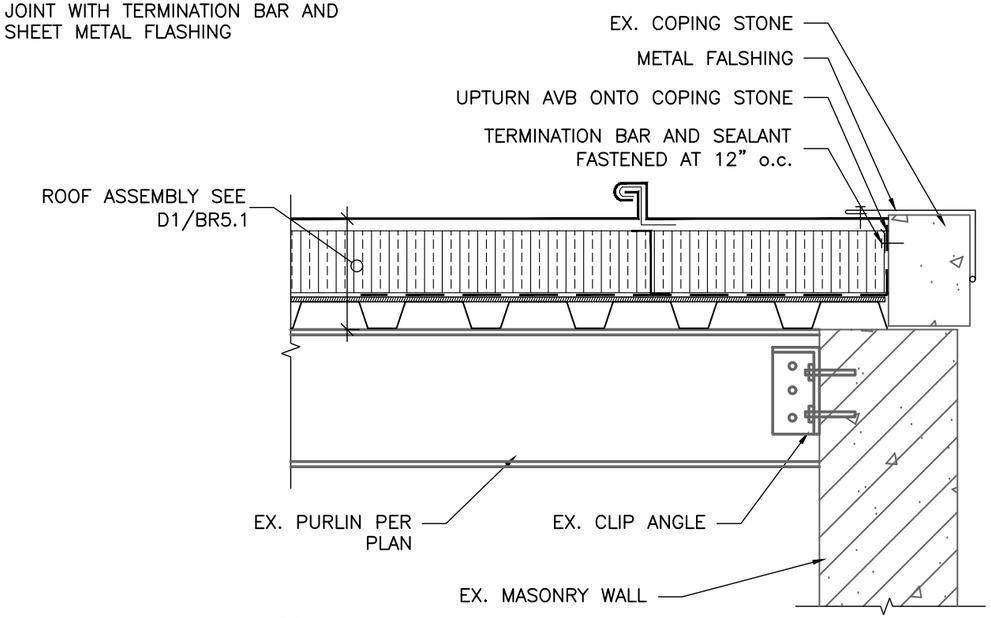
D3 / BR5.2 ROOF RIDGE DETAIL

N.T.S.



D4 / BR5.2 ROOF TO MASONRY WALL INTERFACE

N.T.S.



D5 / BR5.2 GABLE END DETAIL

N.T.S.

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14 PEMBROKE ST TORONTO, ON

DRAWING
SECTION DETAILS

Project Number:	56150-100
Scale:	AS SHOWN
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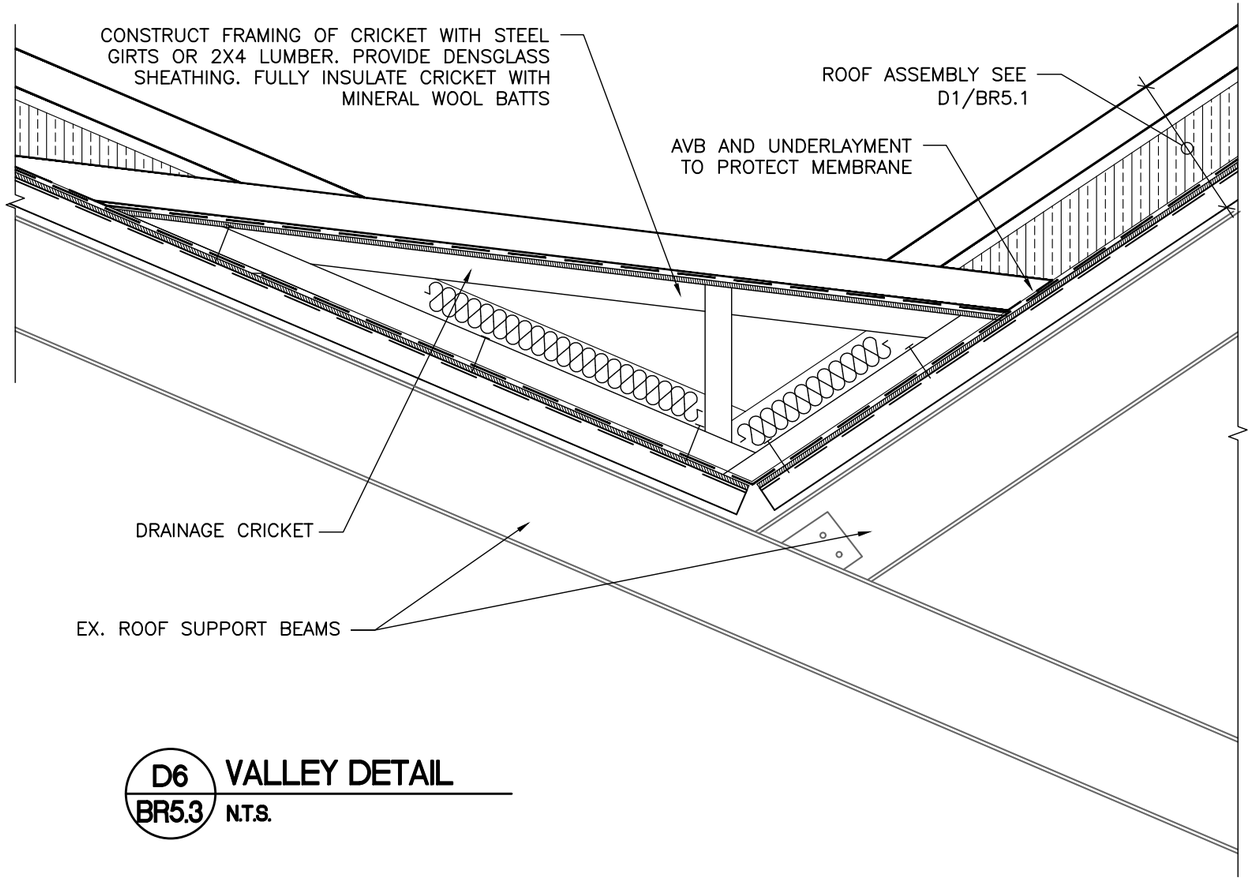
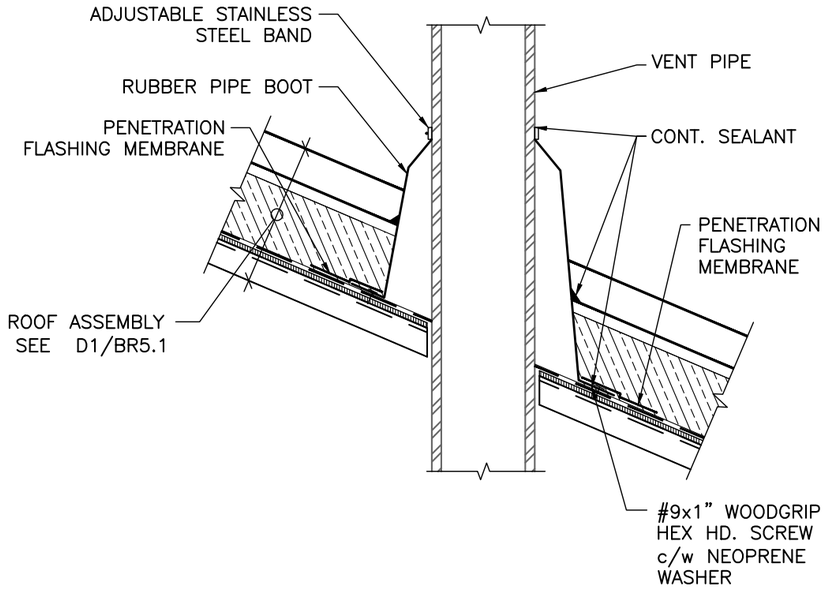
Designed By:	AMB
Drawn By:	TT
Checked By:	JXS

Drawing Number: BR5.2

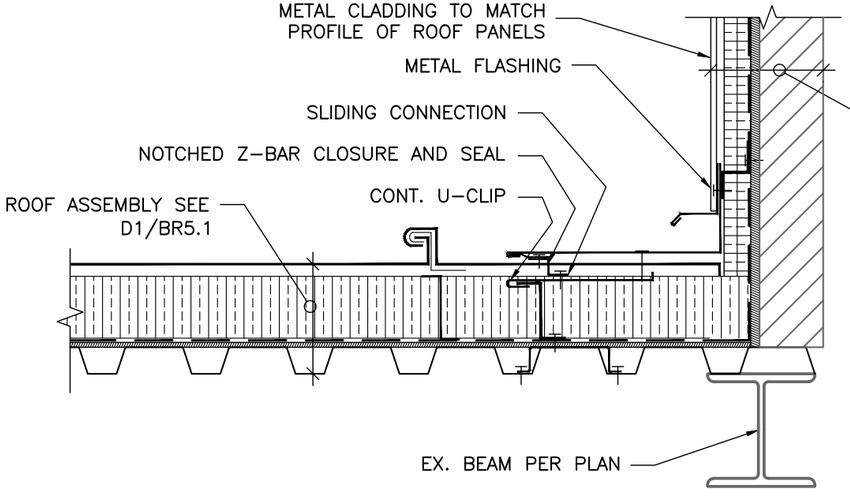
SIZE: 11x17 CAD: P:\56150\100\WORKING\56150-100 GABRIELLE ROY BR1.0.DWG



D6 BR5.3 **VALLEY DETAIL** N.T.S.



D8 BR5.3 **PIPE PENETRATION** N.T.S.



WALL ASSEMBLY (EXTERIOR TO INTERIOR)
.1 METAL CLADDING (SECURED TO NEW GIRTS)
.2 ROCKWOOL TOPROCK DD INSULATION
.3 AIR VPOUR BARRIER MEMBRANE (SAME AS ROOF VAPOUR RETARDER MEMBRANE)
.4 13mm GYPSUM SHEATHING PANEL
.5 EX. RAAC PANEL WALL TO REMAIN

D7 BR5.3 **ROOF TO METAL SIDING WALL INTERFACE** N.T.S.

Client Logo:

NOTE TO CONTRACTOR:
DO NOT SCALE DRAWINGS. CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

THE OWNER/ARCHITECT/CONTRACTOR IS ADVISED THAT M.T.E. CONSULTANTS INC. CANNOT CERTIFY ANY COMPONENT OF THE SITE WORKS NOT INSPECTED DURING CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO NOTIFY M.T.E. CONSULTANTS INC. PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ARRANGE FOR INSPECTION.

Issued for Tender	C	2025/03/14
Issued for Review	B	2025/03/12
Issued for Review	A	2025/02/03

MTE
Engineers, Scientists, Surveyors
905-639-2552

NOTE: THE UNDERSIGNED HAS REVIEWED AND TAKES RESPONSIBILITY FOR THIS DESIGN, AND HAS THE QUALIFICATIONS AND MEETS THE REQUIREMENTS SET OUT IN THE ONTARIO BUILDING CODE TO BE A DESIGNER

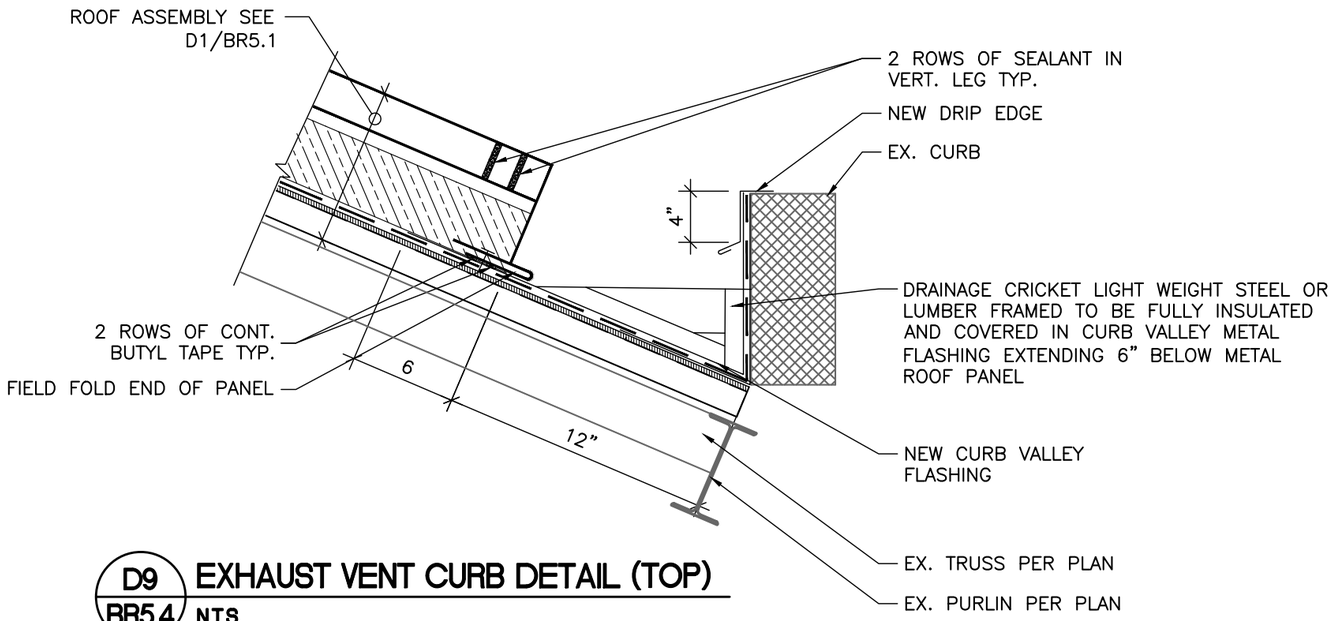
Seal:

PROJECT
GABRIELLE ROY ELEMENTARY SCHOOL ROOF REPLACEMENT
14 PEMBROKE ST TORONTO, ON

DRAWING
SECTION DETAILS

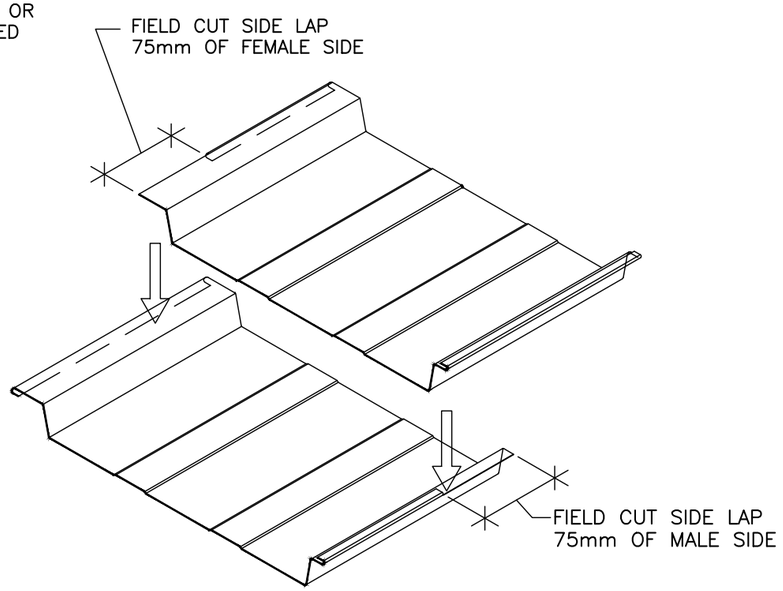
Project Number:	56150-100
Scale:	AS SHOWN
Date:	March 14, 2025
Project Manager:	AMB
Designed By:	AMB
Drawn By:	TT
Checked By:	JXS

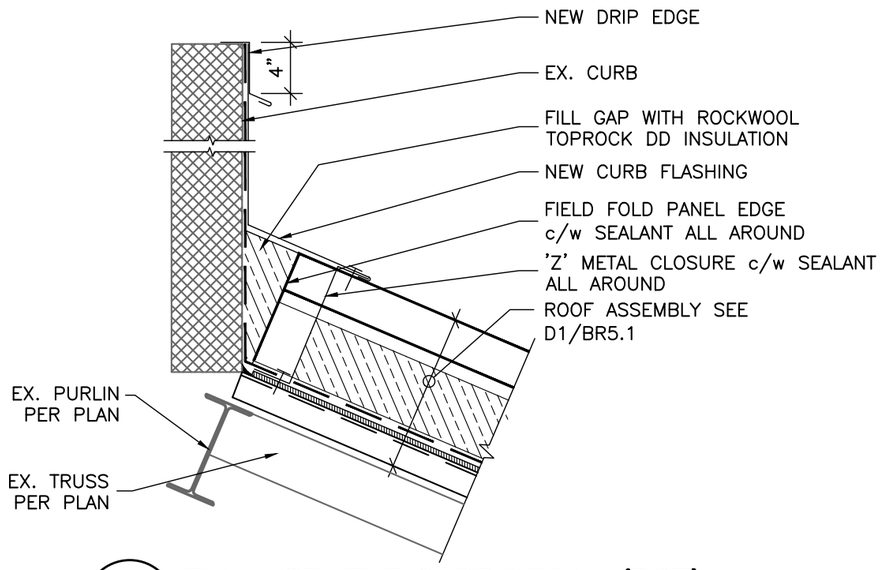
Drawing Number: **BR5.3**



D9 / BR5.4 EXHAUST VENT CURB DETAIL (TOP)

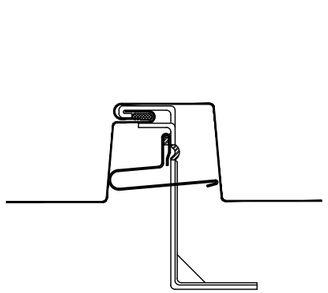
N.T.S.



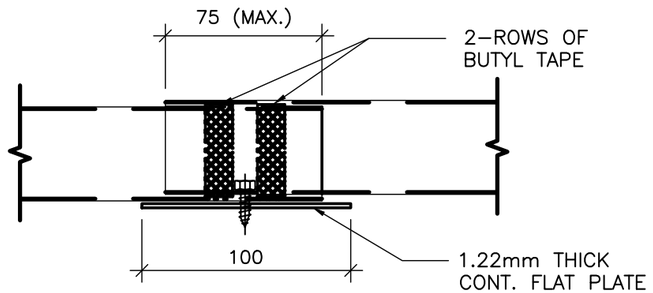


D10 / BR5.4 EXHAUST VENT CURB DETAIL (BOT)

N.T.S.



TYPICAL SIDE LAP



TYPICAL END LAP

D11 / BR5.4 SIDE AND END LAP DETAILS

N.T.S.

Client Logo:

NOTE TO CONTRACTOR:
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14 PEMBROKE ST TORONTO, ON

DRAWING
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Project Manager:	AMB
Designed By:	AMB
Drawn By:	TT
Checked By:	JXS

Drawing Number: BR5.4

Appendix A

Pre-Renovation Designated Substances and Hazardous Materials Survey

ARCADIS

Conseil scolaire Viamonde

Pre-Renovation Designated Substances and Hazardous Materials Survey

École élémentaire Gabrielle-Roy
14 Pembroke Street, Toronto, Ontario

January 31, 2025

Pre-Renovation Designated Substances and Hazardous Materials Survey

École élémentaire Gabrielle-Roy
14 Pembroke Street, Toronto, Ontario

January 31, 2025

Prepared By:
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L6G 3N4
Phone: 905 764 9380

Prepared For:
Conseil scolaire Viamonde
116 Cornelius Parkway
Toronto, Ontario
M6L 2K5
Attention:
Pascal Gosselin, Manager of Rehabilitation Projects, Energy Conservations and Preventive Maintenance

Our Ref:
Project No. 30246134

Prepared by:

_____
Dwayne Kellyman, Dipl. Tech.
Technical Specialist, Field Supervisor

_____
Jean Daigle
Senior Technical Specialist – Project Manager

Contents

Tables

Appendices

1 Introduction

Arcadis Professional Services (Canada) Inc. (Arcadis) was retained by the Conseil scolaire Viamonde (CSV) to conduct a pre-renovation designated substances and hazardous materials survey in designated areas of École élémentaire Gabrielle-Roy located at 14 Pembroke Street, Toronto, Ontario.

The information in this report is to be provided to all bidders on a project in accordance with the requirements of the *Occupational Health and Safety Act*.

The building was reportedly constructed in 1929 with additions built in 1954 and 1966.

It is our understanding that a section of roofing is scheduled to be replaced. The designated study areas were limited to areas affected by the proposed roof replacement project including replacement of roof decking materials and are based on information provided by the CSV. The designated study areas included Attic A-1 and Rooms 307, 308, 309, 310, 310A, 311, 312, 313, 314 and the section of Corridor C301 directly below the area where the roof is being replaced. The survey included primarily inspecting materials in the designated study areas that are anticipated to be affected by the renovation project.

Locations of designated study areas and construction eras are shown on floor plans provided in Appendix A.

The survey was undertaken to report on the presence or suspected presence of readily observable designated substances and hazardous materials.

1.1 Scope of Work

The scope of work for our investigation included:

- review of existing information;
- investigation of readily-accessible areas in the designated study areas for the presence of designated substances and hazardous materials used in building construction materials;
- obtaining representative bulk samples of materials suspected of containing asbestos and paint chip samples for lead;
- laboratory analyses of bulk samples for asbestos content;
- laboratory analyses of paint chip samples for lead content; and
- preparation of a report outlining the findings of the investigation.

Mr. Dwayne Kellyman of Arcadis visited the site on November 8, 2024, to conduct the designated substances and hazardous materials survey at École élémentaire Gabrielle-Roy.

2 Regulatory Discussion and Methodology

Ontario Occupational Health and Safety Act (OHSA)

The Ontario *Occupational Health and Safety Act* (OHSA) sets out, in very general terms, the duties of employers and others to protect workers from health and safety hazards on the job. These duties include, but are not limited to:

- taking all reasonable precautions to protect the health and safety of workers [clause 25(2)(h)];
- ensuring that equipment, materials and protective equipment are maintained in good condition [clause 25(1)(b)];
- providing information, instruction and supervision to protect worker health and safety [clause 25(2)(a)]; and
- acquainting a worker or a person in authority over a worker with any hazard in the work and in the handling, storage, use, disposal and transport of any article, device, equipment or a biological, chemical or physical agent [clause 25(2)(d)].

In addition, Section 30 of the OHSA deals with the presence of designated substances on construction projects. Compliance with the OHSA and its regulations requires action to be taken where there is a designated substance hazard on a construction project.

Section 30 of the OHSA requires the owner of a project to determine if designated substances are present on a project and, if so, to inform all potential contractors as part of the bidding process. Contractors who receive this information are to pass it onto other contractors and subcontractors who are bidding for work on the project.

Regulation for Construction Projects, O.Reg. 213/91

The *Regulation for Construction Projects*, O.Reg. 213/91, applies to all construction projects. The following sections of the regulation would apply to situations where there is the potential for workers to be exposed to designated substances:

Section 14	(5)	A competent person shall perform tests and observations necessary for the detection of hazardous conditions on a project.
Section 21	(1)	A worker shall wear such protective clothing and use such personal protective equipment or devices as are necessary to protect the worker against the hazards to which the worker may be exposed.
	(2)	A worker's employer shall require the worker to comply with subsection (1).
	(3)	A worker required to wear personal protective clothing or use personal protective equipment or devices shall be adequately instructed and trained in the care and use of the clothing, equipment or device before wearing or using it.

Section 30 Workers who handle or use substances likely to endanger their health shall be provided with washing facilities with clean water, soap and individual towels.

Section 46 (1) A project shall be adequately ventilated by natural or mechanical means,

(a) if a worker may be injured by inhaling a noxious...dust or fume;

(2) If it is not practicable to provide natural or mechanical ventilation in the circumstances described in clause (1)(a), respiratory protective equipment suitable for the hazard shall be provided and be used by the workers.

Section 59 If the dissemination of dust is a hazard to a worker, the dust shall be adequately controlled or each worker who may be exposed to the hazard shall be provided with adequate personal protective equipment.

Regulation for Designated Substances (O.Reg. 490/09)

The *Designated Substance Regulation* (O.Reg. 490/09) specifies occupational exposure limits (OELs) for designated substances and requires an assessment and a control program to ensure compliance with these OELs.

Although, O.Reg. 490/09 and the OELs do not apply to an employer on a construction project, or to their workers at the project, employers still have a responsibility to protect the health of their workers and to comply with the OHSA and other applicable regulations. Section 25(2)(h) of the OHSA requires that employers take "every precaution reasonable in the circumstances for the protection of a worker".

Other regulatory requirements (and guidelines) which apply to control of exposure to designated substances and hazardous materials are referenced in the sections below.

2.1 Asbestos

Asbestos has been widely used in buildings, both in friable applications (materials which can be crumbled, pulverized or powdered by hand pressure, when dry) such as pipe and tank insulation, sprayed-on fireproofing and acoustic texture material and in non-friable manufactured products such as floor tile, gaskets, cement board and so on. The use of asbestos in friable applications was curtailed around the mid-1970s and, as such, most buildings constructed prior to about 1975 contain some form of friable construction material with an asbestos content. The use of asbestos in certain non-friable materials continued beyond the mid-1970s.

Control of exposure to asbestos is governed in Ontario by Regulation 278/05 – *Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations*. Disposal of asbestos waste (friable and non-friable materials) is governed by Ontario Regulation 278/05 and by Ontario Regulation 347, *Waste Management – General*. O.Reg. 278/05 classifies asbestos work operations into three types (Type 1, 2 and 3), as shown in Table C-1 in Appendix C, and specifies procedures to be followed in conducting asbestos abatement work.

2.2 Lead

Lead is a heavy metal that can be found in construction materials such as paints, coatings, mortar, concrete, pipes, solder, packings, sheet metal, caulking, glazed ceramic products and cable splices. Lead has been used historically in exterior and interior paints.

In Canada, the Surface Coating Materials Regulations (SOR/2016-193) under the federal Hazardous Products Act provides a concentration of metals that must not be exceeded in surface coatings that are presently sold in this country. Where no criteria is listed, the laboratory detection limit is used.

The *National Plumbing Code* allowed lead as an acceptable material for pipes until 1975 and in solder until 1986

The *Environmental Abatement Council of Canada (EACC) Lead Guideline* for Construction, Renovation, Maintenance or Repair, October 2014, states the following:

- Paints or coatings containing less than or equal to 0.1% lead by weight (1,000 ppm) are considered low-level lead paints. If these materials are disturbed in a non-aggressive manner, performed using normal dust control procedures, then worker protection from the inhalation of lead is not required.
- Paints or coatings containing between 0.1% and 0.5% (5,000 ppm) lead by weight are considered lead-containing paints. Tasks performed that disturb these materials must be completed using precautionary measures and procedures specified in the guideline.
- Construction operations involving lead-based paints with concentrations greater than 0.5% lead must always be completed in accordance with precautionary measures and procedures specified in the guideline.

The Ministry of Labour *Guideline, Lead on Construction Projects*, dated April 2011, also provides guidance in the measures and procedures that should be followed when handling lead containing materials during construction projects. In the guideline, lead-containing construction operations are classified into three groups - Type 1 (low risk), Type 2 (medium risk) and Type 3 (high risk) based on presumed airborne concentrations of lead, as shown in Appendix C, Table C-2. Any operation that may expose a worker to lead that is not a Type 1, Type 2, or Type 3b operation, is classified as a Type 3a operation.

2.3 Mercury

Mercury has been used in electrical equipment such as alkaline batteries, fluorescent light bulbs (lamps), high intensity discharge (HID) lights (mercury vapour, high pressure sodium and metal halide), “silent switches” and in instruments such as thermometers, manometers and barometers, pressure gauges, float and level switches and flow meters. Mercury-containing lamps, the bulk of which are 1.22 m (four foot) fluorescent lamps contain between 7 and 40 mg of mercury each. Mercury compounds have also been used historically as additives in latex paint to protect the paint from mildew and bacteria during production and storage.

The intentional addition of mercury to Canadian-produced consumer paints for interior use was prohibited in 1991. Mercury may have remained in paints after 1991, however, as a result of impurities in the paint ingredients or cross-contamination due to other manufacturing processes. The *Surface Coating Materials Regulations* made under the *Hazardous Products Act* set a maximum total mercury concentration of 10 mg/kg (0.001 percent) for surface coating materials (including paint). This criterion level applies to the sale and importation of new surface coating materials.

Mercury-containing thermostats and silent light switches are mercury tilt switches which are small tubes with electrical contacts at one end of the tube. A mercury tilt switch is usually present when no switch is visible. Mercury switches often have the word “TOP” stamped on the upper end of the switch, which is visible after removing the cover plate. If mercury switches are to be removed, the entire switch should be removed and placed into a suitable container for storage and disposal.

Waste light tubes generated during renovations or building demolition and waste mercury from equipment must either be recycled or disposed of in accordance with the requirements of Ont. Reg. 347 - *Waste Management, General*.

Waste mercury in amounts less than 5 kg (per month) are exempt from the generator registration requirements prescribed by O.Reg. 347 – *Waste Management – General*. Waste mercury from mercury switches or gauges should, however, be properly collected and shipped to a recycling facility or disposed of as a hazardous waste. Removal of mercury-containing equipment (e.g., switches, gauges, controls, etc.) should be carried out in a manner which prevents spillage and exposure to workers.

2.4 Silica

Silica exists in several forms of which crystalline silica is of most concern with respect to potential worker exposures. Quartz is the most abundant type of crystalline silica. Some commonly used construction materials containing silica include brick, refractory brick, concrete, concrete block, cement, mortar, rock and stone, sand, fill dirt, topsoil and asphalt containing rock or stone.

The Ministry of Labour *Guideline, Silica on Construction Projects*, dated April 2011, provides guidance in controlling exposure to silica dust during construction activities. In the guideline, silica-containing construction operations are classified into three groups - Type 1 (low risk), Type 2 (medium risk) and Type 3 (high risk) based on presumed airborne concentrations of respirable crystalline silica in the form of cristobalite, tridymite, quartz and tripoli as shown in Appendix C, Table C-3.

2.5 Vinyl Chloride

Vinyl chloride vapours may be released from polyvinyl chloride (PVC) products in the event of heating or as a result of decomposition during fire. PVC is used in numerous materials that may be found in building construction, including, for example, piping, conduits, siding, window and door frames, plastics, garden hoses, flooring and wire and cable protection.

2.6 Acrylonitrile

Acrylonitrile is used to produce nitrile-butadiene rubber, acrylonitrile-butadiene-styrene (ABS) polymers and styrene-acrylonitrile (SAN) polymers. Products made with ABS resins which may be found in buildings include telephones, bottles, packaging, refrigerator door liners, plastic pipe, building panels and shower stalls. Acrylonitrile can be released into the air by combustion of products containing ABS.

2.7 Other Designated Substances

Isocyanates are a class of chemicals used in the manufacture of certain types of plastics, foams, coatings and other products. Isocyanate-based building construction materials may include rigid foam products such as foam-core panels and spray-on insulation and paints, coatings, sealants and adhesives. Isocyanates may be inhaled if they are present in the air in the form of a vapour, a mist or a dust.

Benzene is a clear, highly flammable liquid used mainly in the manufacture of other chemicals. The commercial use of benzene as a solvent has practically been eliminated, however it continues to be used as a solvent and reactant in laboratories.

Arsenic is a heavy metal used historically in pesticides and herbicides. The primary use in building construction materials was its use in the wood preservative chromated copper arsenate (CCA). CCA was used to pressure treat lumber since the 1940's. Pressure-treated wood containing CCA is no longer being produced for use in most residential settings.

Ethylene oxide is a colourless gas at room temperature. it has been used primarily for the manufacture of other chemicals, as a fumigant and fungicide and for sterilization of hospital equipment.

Coke oven emissions are airborne contaminants emitted from coke ovens and are not a potential hazard associated with building construction materials.

2.8 Polychlorinated Biphenyls (PCBs)

The management of equipment classified as waste and containing Polychlorinated Biphenyls (PCBs) at concentrations of 50 parts per million (mg/kg) or greater is regulated by Ontario Regulation 362*, Waste Management – PCBs*. Under this regulation, PCB waste is defined as any waste material containing PCBs in concentrations of 50 mg/kg or greater. Any equipment containing PCBs at or greater than this level, such as transformers, switchgear, light ballasts and capacitors, which is removed from service due to age, failure or as a result of decommissioning, is considered to constitute a PCB waste. Although current federal legislation (effective 1 July 1980) has prohibited the manufacture and sale of new equipment containing PCBs since that time, continued operation of equipment supplied prior to this date and containing PCBs is still permitted. Handling, storage and disposition of such equipment is, however, tightly regulated and must be managed in accordance with provincial and federal government requirements as soon as it is taken out of service or becomes unserviceable.

In most institutional, commercial facilities and in smaller industrial facilities, the primary source of equipment potentially containing PCBs is fluorescent and H.I.D. light ballasts. Small transformers may also be present. In larger industrial facilities, larger transformers and switch gear containing, or potentially containing, PCBs may also be present.

PCBs were also commonly added to industrial paints from the 1940s to the late 1970s. PCBs were added directly to the paint mixture to act as a fungicide, to increase durability and flexibility, to improve resistance to fires and to increase moisture resistance. The use of PCBs in new products was banned in Canada in the 1970s. PCB amended paints were used in speciality industrial/institutional applications prior to the 1970s including government buildings

and equipment such as industrial plants, radar sites, ships as well as non-government rail cars, ships, grain bins, automobiles and appliances.

Removal of in-service equipment containing PCBs, such as fluorescent light ballasts, capacitors and transformers, is subject to the requirements of the federal *PCB Regulations* (discussed below).

The *PCB Regulations*, which came into force on 5 September 2008, were made under the *Canadian Environmental Protection Act*, 1999 (CEPA 1999) with the objective of addressing the risks posed by the use, storage and release to the environment of PCBs, and to accelerate their destruction. The *PCB Regulations* set different end-of-use deadlines for equipment containing PCBs at various concentration levels.

The Regulations Amending the PCB Regulations and Repealing the Federal Mobile PCB Treatment and Destruction Regulations were published on 23 April 2014, in the Canada Gazette, Part II, and came into force on 1 January 2015. The most notable part of the amendments is the addition of an end-of-use deadline date of 31 December 2025 for specific electrical equipment located at electrical generation, transmission and distribution facilities.

When the PCB materials are classified as waste, jurisdiction falls under the Ontario Ministry of the Environment and Climate Change (MOECC) and O.Reg. 362. All remedial and PCB management work must be carried out under the terms of a Director's Instruction issued by an MOECC District Office (for quantities of PCB fluid greater than 50 litres). The PCB waste stream, regardless of quantity, must be registered with the MOECC, in accordance with O.Reg. 347, *General - Waste Management*. O.Reg. 362 applies to any equipment containing greater than 1 kg of PCBs.

2.9 Ozone-Depleting Substances (ODS) and Other Halocarbons

Ontario Regulation 463/10 – *Ozone Depleting Substances and Other Halocarbons*, applies to the use, handling and disposal of Class 1 ozone-depleting substances, including various chlorofluorocarbons (CFCs), halons and other halocarbons, Class 2 ozone-depleting substances, including various hydrochlorofluorocarbons (HCFCs) and halocarbons, and other halocarbons, including fluorocarbons (FCs) and hydrofluorocarbons (CFCs). The most significant requirements for handling of ozone-depleting substances (ODS) and other Halocarbons, which include, for example, refrigerants used in refrigeration equipment and chillers, include the following:

- certification is required for all persons testing, repairing, filling or emptying equipment containing ODS and other halocarbons;
- the discharge of a Class 1 ODS or anything that contains a Class 1 ODS to the natural environment or within a building is prohibited;
- the making, use of, selling of or transferring of a Class 1 ODS is restricted to certain conditions;
- the discharge of a solvent or sterilant that contains a Class 2 ODS is prohibited;
- the making, use of, selling of or transferring of a solvent or sterilant that contains a Class 2 ODS is restricted to certain conditions;

- fire extinguishing equipment that contains a halon may be discharged to fight fires, except fires for firefighting training purposes;
- portable fire extinguishing equipment that contains a halon may be used or stored if the extinguisher was sold for use for the first time before 1 January 1996;
- records of the servicing and repair of equipment containing ODS and other halocarbons must be prepared and maintained by the owner of the equipment; and
- equipment no longer containing ODS and other halocarbons must be posted with a notice completed by a certified person.

Ontario Regulation 347, *General – Waste Management*, has also been amended to provide for more strict control of CFCs. The requirements under the amended regulation apply primarily to the keeping of records for the receipt or recycling of CFC waste.

2.10 Mould

Moulds are forms of fungi that are found everywhere both indoors and outdoors all year round. Outdoors, moulds live in the soil, on plants and on dead and decaying matter. More than 1000 different kinds of indoor moulds have been found in buildings. Moulds spread and reproduce by making spores, which are all small and light-weight, able to travel through air, capable of resisting dry, adverse environmental conditions, and hence capable of surviving a long time. Moulds need moisture and nutrients to grow and their growth is stimulated by warm, damp and humid conditions.

Control of exposure to mould is required under Section 25(2)(h) of the Ontario *Occupational Health and Safety Act*, which states that employers shall take every precaution reasonable in the circumstances for the protection of workers. Recommended work practices are outlined in the following documents:

- *Mould Guidelines for the Canadian Construction Industry*. Standard Construction Document CCA 82 2004. Canadian Construction Association.
- *Mould Abatement Guidelines*. Environmental Abatement Council of Ontario. Edition 3. 2015.

3 Results and Discussion

3.1 Asbestos

Arcadis reviewed a report prepared by Arcadis for the CSV titled *"Survey of Asbestos-Containing Materials, École élémentaire Gabrielle-Roy, 14 Pembroke Street, Toronto, Ontario"* dated December 17, 2020. Information and bulk sample analysis results obtained from this existing report was utilized by Arcadis during the course of our investigation and in the preparation of this report.

During the course of our site investigation, representative bulk samples of material were collected by Arcadis staff. The samples were forwarded to EMSL Canada Inc. for asbestos analyses. Results of bulk sample analysis for asbestos content are provided in Table 3.1. Table 3.1 also include sample results that are outside of the designated study areas, which are provided for references purposes only. Laboratory reports for samples collected as part of this investigation are provided in Appendix B. Locations of accessible asbestos-containing materials are shown on the floor plan provided in Appendix A.

Table 3-1 Summary of Results of Analyses of Bulk Samples for Asbestos Content

Sample №	Location	Description	Asbestos Content
1A	Room A-1	Gypsum roof decking material	None detected
1B	Room A-1	Gypsum roof decking material	None detected
1C	Room A-1	Gypsum roof decking material	None detected
2A	Room A-1	Window muntin putty	**2% Chrysotile**
3A	Room A-1	Parging cement in ceiling vent penetration	**65% Chrysotile**
C101-PL-1A	Rm C101	Plaster (smooth) wall	**0.7% chrysotile** (1)
C101-PL-1A	Rm C101	Plaster (smooth) wall	**0.7% chrysotile** (1)
116D-PL62A	Rm 116D	Plaster (textured) repairs	None detected (1)
214-PL-2B	Rm 214	Plaster (textured) repairs	None detected (1)
212-PL-2C	Rm 212	Plaster (textured) repairs	None detected (1)
C104-PL-3A	Rm C104	Plaster on bulkhead lighting structure	None detected (1)
C104-PL-3B	Rm C104	Plaster on bulkhead lighting structure	None detected (1)
C104-PL-3C	Rm C104	Plaster on bulkhead lighting structure	None detected (1)
117—PL-4A	Rm 117	Plaster (textured) new	**1.0% chrysotile** (1)
215-PL-5A	Rm 215	Plaster (textured) old wall	None detected (1)
C201-PL-5B	Rm C201	Plaster (textured) old wall	None detected (1)
C301-PL-5C	Rm C301	Plaster (textured) old wall	None detected (1)

Sample №	Location	Description	Asbestos Content
(1) C3	Rm C201	Plaster (textured) old wall	None detected (1)
(1) C4	Rm C104	Plaster (textured) old wall	None detected (1)
(1) C5	Rm C104	Plaster (textured) old wall	None detected (1)
(1) C6	Rm C104	Plaster (textured) old wall	None detected (1)
(1) C7	Rm C104	Plaster (textured) old wall	None detected (1)
123A-PL-6A	Rm 123A	Plaster (smooth) new	None detected (1)
123A-PL-6B	Rm 123A	Plaster (smooth) new	None detected (1)
123A-PL-6C	Rm 123A	Plaster (smooth) new	None detected (1)
102-PL-8A	Rm 102	Plaster (smooth) wall 1955	None detected (1)
102-PL-8B	Rm 102	Plaster (smooth) wall 1955	None detected (1)
101-PL-8C	Rm 101	Plaster (smooth) wall 1955	None detected (1)
102-DW-1A	Rm 102	Drywall joint compound - pipe chase	None detected (1)
116F-DW-1B	Rm 116F	Drywall joint compound - wall	None detected (1)
129D-DW-1C	Rm 129D	Drywall joint compound - wall	None detected (1)
212A-DW-1D	Rm 212A	Drywall joint compound - wall	None detected (1)
210-DW-1E	Rm 210	Drywall joint compound - wall	**0.5% chrysotile** (1,2)
104-FT-2A	Rm 104	12”x12” floor tile – yellow green with white fleck	None detected (PLM) (1) None detected (TEM) (1)
116-FT-2B	Rm 116	12”x12” floor tile – yellow green with white fleck	None detected (1)
116E-FT-2C	Rm 116E	12”x12” floor tile – yellow green with white fleck	None detected (1)
102-FT-3A	Rm 102	12”x12” floor tile – red with white fleck	**3.1% chrysotile (TEM)** (1)
102-FT-4A	Rm 102	12”x12” floor tile – black bottom layer	None detected (PLM) (1) None detected (TEM) (1)
102-FT-4B	Rm 102	12”x12” floor tile – black bottom layer	None detected (1)
102-FT-4C	Rm 102	12”x12” floor tile – black bottom layer	None detected (1)
116-FT-5A	Rm 116	12”x12” floor tile – terrazzo style, white, pink and blue	None detected (PLM) (1) None detected (TEM) (1)
116-FT-5B	Rm 116	12”x12” floor tile – terrazzo style, white, pink and blue	None detected (1)
116-FT-5C	Rm 116	12”x12” floor tile – terrazzo style, white, pink and blue	None detected (1)
111H-FT-6A	Rm 111H	12” x12” floor tile – beige with beige fleck	None detected (PLM) (1) None detected (TEM) (1)

Sample №	Location	Description	Asbestos Content
111H-FT-6B	Rm 111H	12” x12” floor tile – beige with beige fleck	None detected (1)
111H-FT-6C	Rm 111H	12” x12” floor tile – beige with beige fleck	None detected (1)
111H-FT-7A	Rm 111H	12” x12” floor tile – dark beige with black and gray fleck	None detected (PLM) (1) None detected (TEM) (1)
111H-FT-7B	Rm 111H	12” x12” floor tile – dark beige with black and gray fleck	None detected (1)
111H-FT-7C	Rm 111H	12” x12” floor tile – dark beige with black and gray fleck	None detected (1)
118-FT-8A	Rm 118	12” x12” floor tile – beige with black/brown/gray and red fleck	**1.3% chrysotile (TEM)** (1,2)
118-FT-9A	Rm 118	12” x12” floor tile – beige with black/brown/gray and red fleck	None detected (TEM) (1)
113-FT-9B	Rm 113	12” x12” floor tile – beige with black/brown/gray and red fleck	None detected (1)
113-FT-9C	Rm 113	12” x12” floor tile – beige with black/brown/gray and red fleck	None detected (1)
133-FT-10A	Rm 133	12” x12” floor tile – white with turquoise	None detected (PLM) (1) None detected (TEM) (1)
133-FT-10B	Rm 133	12” x12” floor tile – white with turquoise	None detected (1)
133-FT-10C	Rm 133	12” x12” floor tile – white with turquoise	None detected (1)
215-FT-11A	Rm 215	12” x 12” floor tile – beige with purple/brown fleck	None detected (PLM) (1) None detected (TEM) (1)
213-FT-11B	Rm 213	12” x 12” floor tile – beige with purple/brown fleck	None detected (1)
304-FT-11C	Rm 304	12” x 12” floor tile – beige with purple/brown fleck	None detected (1)
215-FT-12A	Rm 215	12” x 12” floor tile – beige with directional brown fleck	**2.8 % chrysotile (TEM)** (1)
216-FT-13A	Rm 216	12” x 12” floor tile – white with wide red fleck	**2.3 % chrysotile (TEM)** (1)
311-FT-14A	Rm 311	Vinyl sheet flooring – black back	None detected (PLM) (1,2) <0.025% chrysotile (TEM)(1,2,3)
311-FT-14A	Rm 311	Vinyl sheet flooring beige/orange	None detected (PLM) (1,2) None detected (TEM) (1,2)
311-FT-14B	Rm 311	Vinyl sheet flooring beige/orange	None detected (1,2)
311-FT-14C	Rm 311	Vinyl sheet flooring beige/orange	None detected (1,2)
303-FT-15A	Rm 303	12” x 12” floor tile – pink beige with white brown fleck	None detected (PLM) (1) None detected (TEM) (1)

Sample №	Location	Description	Asbestos Content
303-FT-15B	Rm 303	12” x 12” floor tile – pink beige with white brown fleck	None detected (1)
303-FT-15C	Rm 303	12” x 12” floor tile – pink beige with white brown fleck	None detected (1)
C201-FT-16A	Rm C201	12” x 12” floor tile –beige with red brown fleck	**4.3% chrysotile (TEM)** (1)
C301-FT-17A	Rm C301	12” x 12” floor tile –rust red with white fleck	**4.4% chrysotile (TEM)** (1)
102-CT-2A	Rm 102	12” x 12” ceiling tile – directional fissure	None detected (1)
102-CT-2B	Rm 102	12” x 12” ceiling tile – directional fissure	None detected (1)
102-CT-2C	Rm 102	12” x 12” ceiling tile – directional fissure	None detected (1)
102-CT-3A	Rm 102	12” x 12” ceiling tile – random fissure	None detected (1)
102-CT-3B	Rm 102	12” x 12” ceiling tile – random fissure	None detected (1)
102-CT-3C	Rm 102	12” x 12” ceiling tile – random fissure	None detected (1)
116-CT-5A	Rm 116	2’ x 4’ ceiling tile fissure 4’ brown back	None detected (1)
216-CT-5B	Rm 216	2’ x 4’ ceiling tile fissure 4’ brown back	None detected (1)
214-CT-5C	Rm 214	2’ x 4’ ceiling tile fissure 4’ brown back	None detected (1)
116-F-CT-6A	Rm 116F	2’ x 4’ ceiling tile fissure 4’ red back	None detected (1)
216-CT-6B	Rm 216	2’ x 4’ ceiling tile fissure 4’ red back	None detected (1)
112-CT-6C	Rm112	2’ x 4’ ceiling tile fissure 4’ red back	None detected (1)
116C-CT-7A	Rm 116C	2’ x 4’ ceiling tile – random fissure	None detected (1)
116C-CT-7B	Rm 116C	2’ x 4’ ceiling tile – random fissure	None detected (1)
216-CT-7C	Rm 216	2’ x 4’ ceiling tile – random fissure	None detected (1)
105A-CT-8A	Rm 105A	12” x 12” ceiling tile – pin hole	None detected (1)
105A-CT-8B	Rm 105A	12” x 12” ceiling tile – pin hole	None detected (1)
105A-CT-8C	Rm 105A	12” x 12” ceiling tile – pin hole	None detected (1)
212-CT-11A	Rm 212	2’ x 4’ ceiling tile – random fissure “Armstrong”	None detected (1)
212-CT-11B	Rm 212	2’ x 4’ ceiling tile – random fissure “Armstrong”	None detected (1)
212-CT-11C	Rm 212	2’ x 4’ ceiling tile – random fissure “Armstrong”	None detected (1)
310-CT-12	Rm 310	8” x 16” ceiling tile	None detected (1)
311-CT-13A	Rm 311	2’ x 4’ ceiling tile, circular pattern smooth face	None detected (1,2)
311-CT-13B	Rm 311	2’ x 4’ ceiling tile, circular pattern smooth face	None detected (1,2)
311-CT-13C	Rm 311	2’ x 4’ ceiling tile, circular pattern smooth face	None detected (1,2)

Sample №	Location	Description	Asbestos Content
109-TH-1A	Rm 109	Pipe straight anti-sweat black paper (medium)	**31% chrysotile (TEM)** (1,2)
109-TH-2A	Rm 109	Pipe straight anti-sweat black paper (medium)	**82% chrysotile** (1,2)
109-TH-3	Rm 109	Pipe straight yellow silicate	None detected (1,2)
132-TH-4	Rm 132	Pipe straight blue silicate	None detected (1)
116F-TH-5A	Rm 116F	Pipe straight anti-sweat black paper	None detected (PLM) (1) None detected (TEM) (1)
116F-TH-5B	Rm 116F	Pipe straight anti-sweat black paper	None detected (1)
116F-TH-5C	Rm 116F	Pipe straight anti-sweat black paper	None detected (1)
129G-GB-8A	Rm 129G	Gypsum block cross-contaminated with thermal insulation	**2.5% chrysotile** (1)
129G-TH-9	Rm 129G	Debris on floor	**83% chrysotile** (1)
C105-TH-10A	Rm C105	Pipe straight anti-sweat black paper (small)	None detected (PLM) (1) None detected (TEM) (1)
123-TH-10B	Rm 123	Pipe straight anti-sweat black paper (small)	None detected (1)
123-TH-10C	Rm 123B	Pipe straight anti-sweat black paper (small)	None detected (1)
311-TH-11A	Rm 311	Pipe straight top layer anti-sweat white	**58% chrysotile** (1)
1	Rm 102	Pipe straight insulation blue	None detected (1)
1	Rm 102	Pipe straight insulation blue	None detected (1)
1	Rm 102	Pipe straight insulation blue	None detected (1)
2	Rm 306	Pipe straight insulation yellow	None detected (1)
2	Rm 306	Pipe straight insulation yellow	None detected (1)
2	Rm 306	Pipe straight insulation yellow	None detected (1)
1-0007	Rm 001	Plaster ceiling (textured)	None detected (1)
2-0008	Rm 001	Plaster ceiling (textured)	None detected (1)
3-0009	Rm 001	Plaster ceiling (textured)	None detected (1)
J1	Rm 101	12” x 12” ceiling tile large & small hole	None detected (1)
J2	Rm 101	12” x 12” ceiling tile large & small hole	None detected (1)
J3	Rm 103	12” x 12” ceiling tile large & small hole	None detected (1)
S04	Rm	MJ elbow pipe insulation	None detected (1)
S33	Rm	Aircell pipe insulation	None detected (1)
1-A	Room 118	9” x 9” vinyl floor tile – light brown coloured with directional brown streaks	**0.6% chrysotile** (1,2)

Sample №	Location	Description	Asbestos Content
2-A	Room 118	Mastic on 9” x 9” floor tiles – black coloured on plywood substrate	<0.25% chrysotile (PLM)(1,2,3) <0.25% chrysotile (TEM)(1,2,3)
2-B	Room 118	Mastic on 9” x 9” floor tiles – black coloured on plywood substrate	<0.25% chrysotile(1,2,3)
2-C	Room 118	Mastic on 9” x 9” floor tiles – black coloured on plywood substrate	<0.25% chrysotile(1,2,3)
3-A	Room 118	Mastic on asbestos 12” x 12” vinyl floor tiles – black coloured on plywood substrate	None detected (PLM) (1,2) <0.25% chrysotile (TEM)(1,2,3)
3-B	Room 118	Mastic on asbestos 12” x 12” vinyl floor tiles – black coloured on plywood substrate	None detected (1,2)
3-C	Room 118	Mastic on asbestos 12” x 12” vinyl floor tiles – black coloured on plywood substrate	None detected (1,2)
4-A	Room 118	Vinyl baseboard – black coloured	None detected (PLM) (1,2) None detected (TEM) (1,2)
4-B	Room 118	Vinyl baseboard – black coloured	None detected(1,2,3)
4-C	Room 124	Vinyl baseboard – black coloured	None detected(1,2,3)
5-A	Room 118	Mastic on vinyl baseboard – brown coloured	0.3% chrysotile (PLM) (1,2,3) **1.0% chrysotile (TEM) (1,2)**
6-A	Room 124	Mastic on non-asbestos 12” x 12” vinyl floor tile – black coloured	<0.25% chrysotile (PLM)(1,2,3) <0.25% chrysotile (TEM)(1,2,3)
6-B	Room 124	Mastic on non-asbestos 12” x 12” vinyl floor tile – black coloured	None detected (1)
6-C	Room 124	Mastic on non-asbestos 12” x 12” vinyl floor tile – black coloured	None detected (1)
7-A	Room 118	Drywall joint compound on drywall wall - south	None detected (1)
7-B	Room 118	Drywall joint compound on drywall wall - south	None detected (1)
7-C	Room 124	Drywall joint compound on drywall wall - north	None detected (1)
8-A	Room 118	Plaster on west wall – top coat	None detected (1)
8-B	Room 118	Plaster on ceiling – top coat	None detected (1)
8-C	Room 124	Plaster on east wall – top coat	None detected (1)
8-D	Room 115	Plaster on west wall – top coat	None detected (1)
9-A	Room 118	Plaster on west wall – scratch coat	None detected (1)
9-B	Room 118	Plaster on ceiling – scratch coat	None detected (1)
9-C	Room 124	Plaster on east wall – scratch coat	None detected (1)
9-D	Room 115	Plaster on west wall – scratch coat	None detected (1)

Sample №	Location	Description	Asbestos Content
1-A	Room 124	Bitumen on concrete floor under wood sub floor	None detected (PLM) (1) None detected (TEM) (1)
1-B	Room 124	Bitumen on concrete floor under wood sub floor	None detected (1)
1-C	Room 124	Bitumen on concrete floor under wood sub floor	None detected (1)
1A	Room: 208	Mastic – yellow in colour under carpet	None detected (PLM) (1) None detected (TEM) (1)
1B	Room: 208	Mastic – yellow in colour under carpet	None detected (1)
1C	Room: 208	Mastic – yellow in colour under carpet	None detected (1)
2A	Room: 208	Mastic – tan in colour from vinyl baseboard	None detected (PLM) (1) None detected (TEM) (1)
2B	Room: 116 F	Mastic – tan in colour from vinyl baseboard	None detected (1)
2C	Room: 116F	Mastic – tan in colour from vinyl baseboard	None detected (1)
3A	Room: 208	Vinyl baseboard – black in colour	None detected (PLM) (1) None detected (TEM) (1)
3B	Room: 116F	Vinyl baseboard – black in colour	None detected (1)
3C	Room: 116F	Vinyl baseboard – black in colour	None detected (1)
4A	Room: 208	Subflooring – brown in colour under carpet	None detected (1)
4B	Room: 208	Subflooring – brown in colour under carpet	None detected (1)
4C	Room: 208	Subflooring – brown in colour under carpet	None detected (1)
5A	Room: 208	Mastic – black in colour under beige vinyl floor tile	None detected (PLM) (1) None detected (TEM) (1)
5B	Room: 208	Mastic – black in colour under beige vinyl floor tile	None detected (1)
5C	Room: 208	Mastic – black in colour under beige vinyl floor tile	None detected (1)
6A	Room: 208	Vinyl floor tile – beige in colour under carpet	**0.5% chrysotile (1,2)** **0.62% chrysotile (1,2)** **1.0% chrysotile (TEM) (1,2)**
7A	Room: 116F	Vinyl sheet flooring – white with blue terrazzo design	None detected (PLM) (1) None detected (TEM) (1)
7B	Room: 116F	Vinyl sheet flooring – white with blue terrazzo design	None detected (1)
7C	Room: 116F	Vinyl sheet flooring – white with blue terrazzo design	None detected (1)

Sample №	Location	Description	Asbestos Content
8A	Room: 116F	Vinyl floor tile – beige with white streaks under vinyl sheet flooring	<0.25% chrysotile (PLM) [1,3] <0.1% chrysotile (TEM) [1,3]
8B	Room: 116F	Vinyl floor tile – beige with white streaks under vinyl sheet flooring	<0.25% chrysotile [1,3]
8C	Room: 116F	Vinyl floor tile – beige with white streaks under vinyl sheet flooring	<0.25% chrysotile [1,3]
9A	Room: 116F	Mastic – black in colour under vinyl floor tile	None detected (PLM) [1] None detected (TEM) [1]
9B	Room: 116F	Mastic – black in colour under vinyl floor tile	None detected [1]
9C	Room: 116F	Mastic – black in colour under vinyl floor tile	None detected [1]
10A	Room: 119	Mastic – black in colour under 9” x 9” vinyl floor tile	**1.1% chrysotile [1,2]**
11A	Room: 119	9” x 9” vinyl floor tile – grey/green in colour with white and black streaks	**1.9% chrysotile [1,2]**
12A	Room: 201	Caulking – (putty) grey in colour from interior window frame/glass	<0.25% chrysotile (PLM) [1,3] <0.1% chrysotile (TEM) [1,3]
12B	Room: 216	Caulking – (putty) grey in colour from interior window frame/glass	0.4% chrysotile [1,3]
12C	Room: 317	Caulking – (putty) grey in colour from interior window frame/glass	0.3% chrysotile [1,2,3]
13A	Exterior	Caulking – black in colour from exterior window frame	**1.1% chrysotile [1]**
14A	Exterior	Mortar – brown in colour from brick wall	None detected (PLM) [1] None detected (TEM) [1]
14B	Exterior	Mortar – brown in colour from brick wall	None detected [1]
14C	Exterior	Mortar – brown in colour from brick wall	None detected [1]
1-A	Stair B-1	Mastic on vinyl floor tile – black	**0.57% chrysotile (TEM) [1,2]**
2-A	Vest 113	Mastic on vinyl floor tile – black	None detected (PLM) [1] 0.19% chrysotile (TEM) [1,3]
2-B	Vest 113	Mastic on vinyl floor tile – black	None detected [1]
2-C	Vest 101	Mastic on vinyl floor tile – black	None detected [1]
3-A	Corridor 104	Coat Hanger Alcoves, Mastic on vinyl floor tile – black	None detected [1]
3-B	Corridor 104	Coat Hanger Alcoves, Mastic on vinyl floor tile – black	None detected [1]
3-C	Corridor 104	Coat Hanger Alcoves, Mastic on vinyl floor tile – black	None detected [1]

Sample №	Location	Description	Asbestos Content
1-A	Room 215	Plaster on cove moulding – top coat	None detected (1)
1-B	Room 215	Plaster on cove moulding – top coat	None detected (1)
1-C	Room 215	Plaster on cove moulding – top coat	None detected (1)
2-A	Room 215	Plaster on cove moulding – scratch coat	None detected (1)
2-B	Room 215	Plaster on cove moulding – scratch coat	None detected (1)
2-C	Room 215	Plaster on cove moulding – scratch coat	None detected (1)
1A	Room 210	9” vinyl floor tile – tan with brown & white streaks	**5.3% chrysotile** (1,2)
2A	Room 210	Black mastic under 9” vinyl floor tile	None detected (1,2)
2B	Room 209	Black mastic under 9” vinyl floor tile	None detected (1,2)
2C	Room 210	Black mastic under 9” vinyl floor tile	None detected (1,2)
3A	Room 209	12” vinyl floor tile – yellow with white streaks	0.34% chrysotile (PLM)(1,2,3) **1.1% chrysotile (TEM)**(1,2)
4A	Room 209	Black mastic under 12” vinyl floor tile	None detected (1)
4B	Room 209A	Black mastic under 12” vinyl floor tile	None detected (1)
4C	Room 209	Black mastic under 12” vinyl floor tile	None detected (1)
5A	Room 111G	Black mastic under 12” vinyl floor tile	None detected (1)
5B	Room 111G	Black mastic under 12” vinyl floor tile	None detected (1)
5C	Room 111G	Black mastic under 12” vinyl floor tile	None detected (1)
6A	Room B1	Rubber flooring	None detected (PLM) (1,2) None detected (TEM) (1,2)
6B	Room B1	Rubber flooring	None detected (1,2)
6C	Room B1	Rubber flooring	None detected (1,2)
7A	Room B1	Yellow mastic under rubber flooring	None detected (1,2)
7B	Room B1	Yellow mastic under rubber flooring	None detected (1,2)
7C	Room B1	Yellow mastic under rubber flooring	None detected (1,2)
8A	Room B1	Grey baseboard	None detected (PLM) (1,2) None detected (TEM) (1,2)
8B	Room B1	Grey baseboard	None detected (1,2)
8C	Room B1	Grey baseboard	None detected (1,2)
9A	Room B1	Yellow mastic behind grey baseboard	None detected (1,2)
9B	Room B1	Yellow mastic behind grey baseboard	None detected (1,2)

Sample №	Location	Description	Asbestos Content
9C	Room B1	Yellow mastic behind grey baseboard	None detected (1,2)
10A	Room 210	Black mastic under 12” vinyl floor tile	None detected (1)
10B	Room 210	Black mastic under 12” vinyl floor tile	None detected (1)
10C	Room 210	Black mastic under 12” vinyl floor tile	None detected (1)
11A	Room 210	Brown baseboard mastic	None detected (1)
11B	Room 311	Brown baseboard mastic	None detected (1)
11C	Room 311B	Brown baseboard mastic	None detected (1)
12A	Room 311	Paper backing under vinyl sheet flooring	None detected (PLM) (1,2) None detected (TEM) (1,2)
12B	Room 311A	Paper backing under vinyl sheet flooring	None detected (1,2)
12C	Room 311B	Paper backing under vinyl sheet flooring	None detected (1,2)
13A	Room 109	Ceramic tile grout (floor)	None detected (1,2)
13B	Room 211	Ceramic tile grout (floor)	None detected (1,2)
13C	Room 309	Ceramic tile grout (floor)	None detected (1,2)
14A	Room 108	Ceramic tile mortar bed (floor)	None detected (1,2)
14B	Room 207	Ceramic tile mortar bed (floor)	None detected (1,2)
14C	Room 312	Ceramic tile mortar bed (floor)	None detected (1,2)
15A	Room 109	Ceramic tile grout (wall)	None detected (1,2)
15B	Room 132	Ceramic tile grout (wall)	None detected (1,2)
15C	Room 209C	Ceramic tile grout (wall)	None detected (1,2)
16A	Room 108	Ceramic tile mortar bed (wall)	None detected (1,2)
16B	Room 109	Ceramic tile mortar bed (wall)	None detected (1,2)
16C	Room 109	Ceramic tile mortar bed (wall)	None detected (1,2)
17A	Room 131	Mastic on ceramic tile	None detected (1,2)
17B	Room 132	Mastic on ceramic tile	None detected (1,2)
17C	Room 209C	Mastic on ceramic tile	None detected (1,2)
18A	Room 108	White caulking on ceramic tile	None detected (PLM) (1,2) None detected (TEM) (1,2)
18B	Room 308	White caulking on ceramic tile	None detected (1,2)
18C	Room 313	White caulking on ceramic tile	None detected (1,2)

Sample №	Location	Description	Asbestos Content
19A	Room B1	Window putty	None detected (PLM) (1,2) None detected (TEM) (1,2)
19B	Room 209B	Window putty	**2% chrysotile** (1,2)
20A	Room 111G	Brick mortar	None detected (1)
20B	Room 112	Brick mortar	None detected (1)
20C	Room 314	Brick mortar	None detected (1)
21A	Room 108	Concrete block mortar	None detected (1)
21B	Room 109	Concrete block mortar	None detected (1)
21C	Room 132	Concrete block mortar	None detected (1)
22A	Room 111G	Window caulking beige in color	None detected (PLM) (1) None detected (TEM) (1)
22B	Room 111G	Window caulking beige in color	None detected (1)
22C	Room 111G	Window caulking beige in color	None detected (1)
23A	Room 314	Terracotta brick mortar	None detected (1)
23B	Room 314	Terracotta brick mortar	None detected (1)
23C	Room 314	Terracotta brick mortar	None detected (1)
24A	Stair B1	Textured paint	None detected (1)
24B	Stair B1	Textured paint	None detected (1)
24C	Stair B1	Textured paint	None detected (1)
1A	C103	Masonry block mortar	None detected (1)
1B	C104	Masonry block mortar	None detected (1)
1C	C105	Masonry block mortar	None detected (1)
2A	Exterior	Brick mortar	None detected (1)
2B	Exterior	Brick mortar	None detected (1)
2C	Exterior	Brick mortar	None detected (1)
S04	Rm	MJ elbow pipe insulation	**35% chrysotile**(4)
S33	Rm	Aircell pipe insulation	**65% chrysotile**(4)

NOTES:

(1) Sample results taken from a report prepared by Arcadis for the Conseil scolaire Viamonde titled *Survey of Asbestos-Containing Materials, École élémentaire Gabrielle Roy* dated February 7, 2018.

(2) Material collected in the area have since been removed and is provided here for references purposes only.

(3) Asbestos-containing material" is defined as material that contains 0.5% or more asbestos by dry weight.

(4) Sample results taken from a report prepared by Ontario Environmental and Safety Network Limited dated August 19, 2003.

Bulk samples were analyzed by Polarized Light Microscopy (PLM) analysis, except where "TEM" is noted, in which case Transmission Electron Microscopy analysis was also performed.

< = less than.

Chrysotile = Chrysotile asbestos.

Amosite = Amosite asbestos.

Determination of the locations of asbestos-containing material was made based on the review of existing information, results of bulk sample analysis, visual observations and physical characteristics of the applications as well as our knowledge of the uses of asbestos in building materials.

Based on review of existing information, visual observations, and results of laboratory analyses of samples collected by Arcadis Canada Inc., the following accessible asbestos-containing materials were found to be present in the designated study area:

- 9" x 9" vinyl floor tiles in Rooms 310 and 310A;
- Glazing putty on interior side of window muntins and caulking on exterior side of window frames in Rooms 307, 308, 309, 310, 310A, 311, 312, 313 and 314 and Attic A1;
- Joint compound on drywall walls in Rooms 310 and 310A;
- Smooth plaster on walls and ceilings in Rooms 307, 310, 310A, 311, 312, 313, and 314 and exposed topsides of asbestos-containing plaster ceilings from rooms below in Attic A1;
- Cementitious parging material around perimeter of metal ducting penetrating roof decking in Attic A1;
- Thermal insulation applied to pipe fittings below ceilings in Attic A-1;
- Thermal insulation ("Air-Cell") applied to pipe straights below ceilings Attic A-1; and
- Thermal insulation ("Air-Cell") applied to pipe straights above ceilings in Rooms 311 and the Elevator Shaft.

Please Note: To limit damage to the copper roofing system located over Attic A1, Arcadis did not access below the copper roofing to determine if building materials that may contain asbestos such as roofing paper are present. During the course of roofing removal work, if any materials suspected of containing asbestos are discovered, the work shall not proceed until such time as the required notifications have been made, suspect materials have been tested for asbestos content and an appropriate course of action is determined.

Asbestos-containing thermal insulation applied to pipe fittings and cementitious parging material observed on ducting is a white/grey-coloured cementitious material. Asbestos-containing thermal insulation applied to pipe straights is "Air-Cell" type insulation. "Aircell" is a trade name for a grey-coloured corrugated paper-like type of pipe insulation, usually found on heating and domestic hot water piping.

Glass fibre insulation is readily visually distinguishable (typically yellow in colour) from asbestos-containing insulation materials and if observed was therefore, not tested for asbestos content.

Vinyl floor tiles, caulking and window glazing putty are non-friable materials. The removal, alteration and/or disturbance of these non-friable asbestos-containing materials can be performed as a Type 1 operation as specified in O. Reg. 278/05 if the material is wetted and the work is done only using non-powered, hand-held tools (see Table

C-1 in Appendix C). If the removal, alteration and/or disturbance work is done using power tools that are attached to dust-collecting devices equipped with HEPA filters, then the work is classified as Type 2. If the power tools do not have HEPA filtered dust collecting devices, then the work is Type 3.

The removal, alteration and/or disturbance of less than one square metre of drywall in which asbestos-containing joint filling compounds have been used is classified as a Type 1 operation. The removal, alteration and/or disturbance of one square metre or more of drywall with asbestos-containing joint compounds is a Type 2 operation.

Thermal insulation and parging materials are friable materials. The removal, alteration and/or disturbance of less than 1 m^2 of friable asbestos-containing materials is classified as a Type 2 enclosure operation as specified in O.Reg. 278/05. The removal, alteration and/or disturbance of more than 1 m^2 of friable asbestos-containing materials is classified as a Type 3 operation.

Plaster is a non- or semi-friable material which can become friable when disturbed. According to the Ministry of Labour *"A Guide to the Regulation Respecting Asbestos on Construction Projects and in Buildings and Repair Operations"*, dated November 2007, wetting does not adequately control the spread of dust and fibres during the breaking, cutting, drilling, abrading, grinding, sanding or vibrating of asbestos containing plaster (as well as stucco and other hard finishes) by means of non-powered hand-held tools. As such, Type 1 procedures cannot be used for work on these materials. The removal, alteration and/or disturbance should therefore be classified as a Type 2 or Type 3 operation depending on the tools used, and the amount of material to be removed.

Asbestos may also be present in materials which were not sampled during the course of the asbestos survey carried out by Arcadis, including, but not limited to, areas outside the designated study areas, which include components of electrical equipment (e.g. electric wiring insulation, non-metallic sheathed cable, electrical panel partitions, arc chutes, high-grade electrical paper, etc.), threaded pipe sealants, concrete, asphaltic pavement. Confirmatory testing of any such materials could be undertaken as the need arises (i.e., at the time of renovations, modifications or demolition) or the materials can be assumed to contain asbestos based on findings in adjacent areas.

If any materials which may contain asbestos and which were not tested during the course of the designated substances and hazardous materials survey are discovered during any construction activities, the work shall not proceed until such time as the required notifications have been made and an appropriate course of action is determined.

3.2 Lead

Arcadis reviewed a report prepared by Arcadis for the CSV titled "*Pre-Renovation Designated Substances and Hazardous Materials Survey, Ècole élèmentaire Gabrielle-Roy, 14 Pembroke Street, Toronto, Ontario"* dated April 21, 2020. Information and paint sample analysis results obtained from this existing report was utilized by Arcadis during the course of our investigation and in the preparation of this report.

During the course of our site investigation, a representative paint sample of the predominant paint observed on the structural steel in Attic A1 was collected by Arcadis staff. The sample was forwarded to EMSL Canada Inc. for lead analyses. Results of bulk sample analysis for lead content including results from the above referenced report are provided in Table 3.2. Laboratory report for paint samples collected as part of this investigation are provided in Appendix B.

Table 3-2 Summary of Results of Analyses of Bulk Samples for Lead Content

Sample No.	Sample Location	Sample Description	Lead Content
P-1	Attic A-1	Black paint on steel supports	**250,000 ppm**
P-1	Room 132	Blue paint on plaster	**69,000 mg/kg** (1)
P-2	Room 111G	Beige paint on brick	**3,600 mg/kg** (1)
P-3	Stair B1	White paint on plaster	**90 mg/kg** (1)
P-4	Room 112	Grey paint on floor	**2,300 mg/kg** (1)
P-2	Room 201	Paint on metal window frame – white coloured	**240,000 mg/kg**(1)
P-3	Room 216	Paint on metal window frame – grey coloured	**180,000 mg/kg**(1)
P-4	Room:119	Paint on plaster wall – white coloured	**4,600 mg/kg**(1)
P-5	Exterior	Paint on metal window frame – black coloured	**13,000 mg/kg**(1)

NOTE:

(1) Sample results taken from a report prepared by Arcadis for the CSV titled "*Pre-Renovation Designated Substances and Hazardous Materials Survey, École élémentaire Gabrielle Roy, 14 Pembroke Street, Toronto, Ontario"* dated April 21, 2020.

< = less than.

ppm = part per million

1 mg/kg = 1 ppm

Lead was detected in all paint samples.

Lead may also be present in lead pipe, mortar, glazing on ceramic tiles, in the solder on the seals of bell joints of any cast iron drainpipe and in the solder on the sweated-on joints between copper pipe and fittings.

The *Environmental Abatement Council of Canada (EACC) Lead Guideline for Construction, Renovation, Maintenance or Repair, October 2014*, provides guidance in the measures and procedures that should be followed when handling paints during construction projects, and states the following:

- Paints or coatings containing less than or equal to 0.1% lead by weight (1,000 ppm) are considered low-level lead paints. If these materials are disturbed in a non-aggressive manner, performed using normal dust control procedures, then worker protection from the inhalation of lead is not required.
- Paints or coatings containing between 0.1% and 0.5% (5,000 ppm) lead by weight are considered lead-containing paints. Tasks performed that disturb these materials must be completed using precautionary measures and procedures specified in the guideline.
- Construction operations involving lead-based paints with concentrations greater than 0.5% lead must always be completed in accordance with precautionary measures and procedures specified in the guideline.

The Ontario Ministry of Labour *Guideline, Lead on Construction Projects*, dated April 2011, also provides guidance in the measures and procedures that should be followed when handling lead containing materials during construction projects. In the guideline, lead-containing construction operations are classified into three groups - Type 1 (low risk), Type 2 (medium risk) and Type 3 (high risk) based on presumed airborne concentrations of lead,

as shown in Appendix C, Table C-2. Any operation that may expose a worker to lead that is not a Type 1, Type 2, or Type 3b operation, is classified as a Type 3a operation.

3.3 Mercury

During the course of our site investigation, fluorescent lights were observed in the designated study areas. Mercury should be assumed to be present as a gas in all fluorescent light tubes and in all paint applications, albeit at low levels. The fluorescent light tubes should be recycled for mercury, if the lights are removed.

Proper procedures for removing and handling mercury-containing fluorescent light tubes typically involve:

- ensuring that electrical power to light fixtures has been disconnected and locked out;
- taking all necessary precautions to ensure that fluorescent light tubes and lamps are removed in a manner that prevents breakage; and
- transporting fluorescent lamp tubes and lamps to a licensed processing location for separation and recovery of mercury.

The measures and procedures outlined in the MOL *Guideline, Lead on Construction Projects* for control of potential exposure to lead in paint during construction activities will also serve to control potential exposure to any mercury in paint.

3.4 Silica

Materials observed in the designated study areas which should be considered to contain silica included gypsum board, gypsum board joint compounds, gypsum block, gypsum roof decking, plaster, terrazzo, concrete, concrete block and mortar.

Silica can also be assumed to be present in any gravel on ground surfaces or ballast on roofs and will also be found in asphalt roofing materials if rock or stone are present in the asphalt.

The Ministry of Labour *Guideline, Silica on Construction Projects*, April 2011, provides guidance in controlling exposure to silica dust during construction activities. In the guideline, silica-containing construction operations are classified into three groups - Type 1 (low risk), Type 2 (medium risk) and Type 3 (high risk) based on presumed airborne concentrations of silica, as shown in Appendix C, Table C-3.

Additional precautionary measures should also be implemented for certain types of materials (e.g., plaster and texture coat materials, including non-asbestos applications, concrete block, etc.). For minor disturbances such as drilling, a HEPA-filtered attachment should be used. For removal of more than a minor amount of material, enclosures should be constructed for dust control and separation of the work area from adjacent areas.

3.5 Vinyl Chloride

As mentioned in Section 2.5 above, vinyl chloride would only be a potential exposure concern in the event of combustion of PVC products.

3.6 Acrylonitrile

As mentioned in Section 2.6 above, acrylonitrile would only be a potential exposure concern in the event of combustion of ABS products.

3.7 Other Designated Substances

No other designated substances (benzene, isocyanates, arsenic, ethylene oxide and coke oven emissions) were observed to be present in the designated study areas, and none would be expected to be encountered in any building materials in a form that would represent an exposure concern. Arsenic may be present at low levels in paint applications. The measures and procedures outlined in the MOL *Guideline, Lead on Construction Projects* for control of potential exposure to lead in paint during construction activities will also serve to control potential exposure to any arsenic (or mercury) in paint.

3.8 Polychlorinated Biphenyls (PCBs)

Fluorescent lights were observed in various locations in the designated study areas during the course of our site investigations. Light ballasts, such as those associated with the type of fluorescent lights (T8s) observed in the designated study areas, are usually an electronic type which do not contain PCBs, however, this would be confirmed by an electrician at the time of dismantling of the lights.

3.9 Ozone-Depleting Substances (ODS) and Other Halocarbons

Equipment with refrigerants that may be ODS, that may be affected by the proposed renovation work was not observed during course of the site investigation.

If any ODS-containing equipment is to be removed then they must be handled in the following manner:

- any equipment designated for disposal as scrap must be drained of its contents by a licensed technician and equipped with a label indicating that the equipment no longer contains any refrigerant. The specific requirements for information on the label, as specified in the regulation, must be adhered to;
- equipment designated for relocation to another facility owned by Conseil scolaire Viamonde must be drained and labelled, as above; and
- any equipment that is drained to facilitate relocation to another facility owned by Conseil scolaire Viamonde must be tested for leaks prior to re-filling. The equipment must be re-filled within six months of the leak test.

3.10 Mould

The investigation for mould included a visual inspection of readily-accessible surfaces throughout the designated study areas to determine if any mould was evident. The inspection of mould did not include intrusive inspections of wall cavities. Readily evident suspect mould was not observed in the designated study areas during the course of the site investigation. During renovations or interior demolition work, any mould-impacted materials uncovered/discovered should be remediated following the measures and procedures outlined in the *Canadian Construction Association Standard Construction Document CCA-82 2004 - Mould Guidelines for the Canadian Construction Industry*.

4 Limitations and Service Constraints

The opinions, conclusions and recommendations presented in this report are limited to the information obtained during the performance of the specific scope of service identified in the report. To the extent that Arcadis relied upon any information prepared by other parties not under direct contract to Arcadis, no representation as to the accuracy or completeness of such information is made. This report is an instrument of professional service and the services described in the report were performed in accordance with generally accepted standards and level of skill and care ordinarily exercised by members of the profession working under similar conditions including comparable budgetary and schedule constraints. No warranty, guarantee or certification express or implied, is intended or given with respect to Arcadis' services, opinions, conclusions or recommendations.

Arcadis' observations, the results of any testing and Arcadis' opinions, conclusions and recommendations apply solely to conditions existing at the specific times when and specific locations where Arcadis' investigative work was performed. Arcadis affirms that data gathered and presented in this report was collected in an appropriate manner in accordance with generally accepted methods and practices. Arcadis cannot be responsible for decisions made by our client solely on the basis of economic factors. Observation and testing activities such as those conducted by Arcadis are inherently limited and do not represent a conclusive or complete characterization. Arcadis analyzed only the substances, conditions and locations described in the report at the time indicated. Conditions in other parts of the project site, building or area may vary from conditions at the specific locations where observations were made and where testing was performed by Arcadis. Additionally, other building material hazards which were not identified by Arcadis, may also be present un-accessed areas and in walls, ceilings, cavities, and floors.

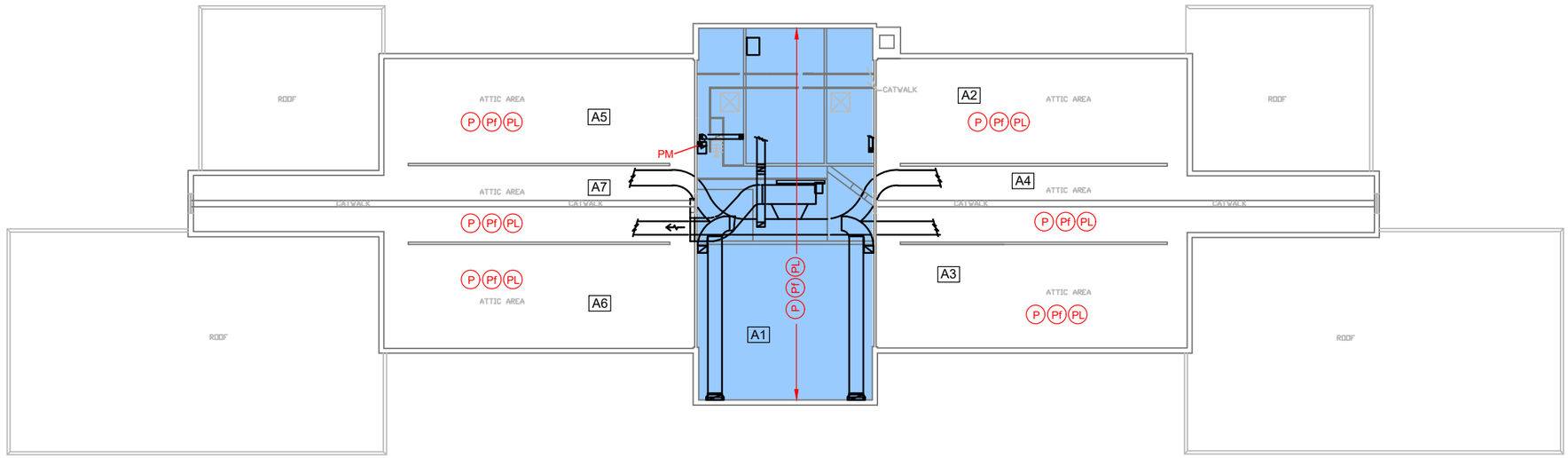
This report is expressly for the sole and exclusive use of the Client for whom this report was originally prepared and for the particular purpose outlined in the report. Reuse of this report or any portion thereof for other than its intended purpose, or if modified, or if used by third parties, shall be at the user's sole risk. This report must be presented in its entirety.

The survey did not include for identification of asbestos in process materials, equipment (including electrical equipment and wiring), furniture (e.g., chairs, tabletops, chalkboards, etc.), nor material outside of the building (e.g., asphaltic pavement).

This report is not intended to be used as a scope of work or technical specification for remediation of designated substances or hazardous materials.

Appendix A

Floor Plans



LEGEND

A2	FUNCTIONAL SPACE
◯	THROUGHOUT FUNCTIONAL SPACE
P	ASBESTOS ON PIPE STRAIGHTS
Pf	ASBESTOS ON PIPE FITTINGS
PL	ASBESTOS PLASTER
PM	ASBESTOS PARGING MATERIAL
	STUDY AREA

NOTE:

1. ASBESTOS GLAZING PUTTY IS PRESENT ON INTERIOR SIDES OF WINDOW MUNTINS AND ASBESTOS CAULKING IS PRESENT ON EXTERIOR SIDES OF WINDOW FRAMES ON ALL WINDOWS IN THE STUDY AREAS.

REVISIONS:

No.	Date:	By:	Revisions

REFERENCE:

1.

ARCADIS

CONSEIL SCOLAIRE VIAMONDE

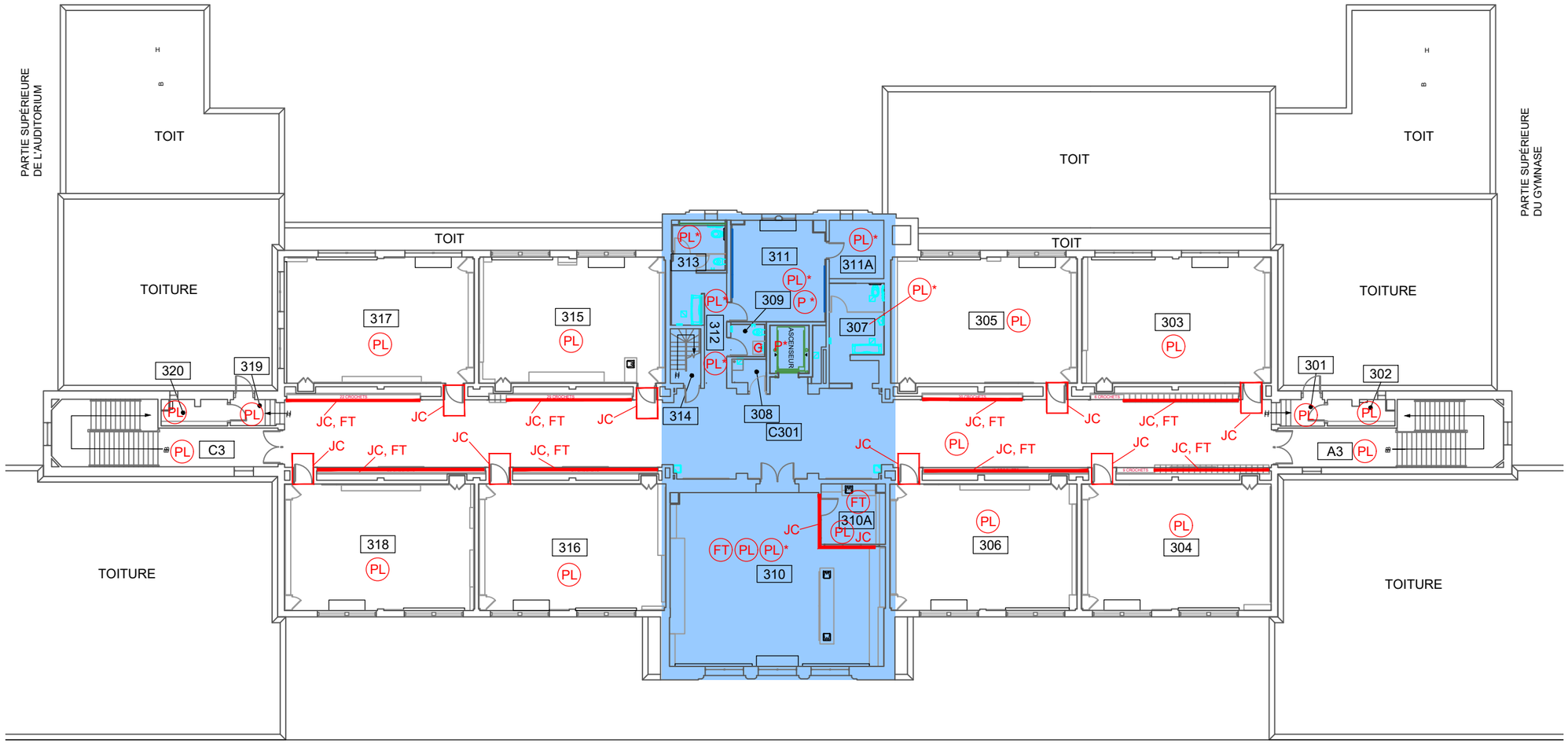
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

LOCATIONS OF ASBESTOS-CONTAINING MATERIALS AND STUDY AREA

ÉCOLE ÉLÉMENTAIRE GABRIELLE ROY
14 PEMBROKE STREET, TORONTO

ATTIC FLOOR PLAN

Drawn By: G.E.C.	Approved By: A.N	Project No: 30246134
Date: JAN 2025	Scale: N.T.S	Drawing No: 30246134-1



LEGEND

317	FUNCTIONAL SPACE
◯	THROUGHOUT FUNCTIONAL SPACE
*	ABOVE CEILING ASSEMBLY
P	ASBESTOS ON PIPE STRAIGHTS
Pf	ASBESTOS ON PIPE FITTINGS
FT	ASBESTOS FLOORING
PL	ASBESTOS PLASTER
JC	ASBESTOS DRYWALL JOINT COMPOUND
M	ASBESTOS MASTIC ON BASEBOARD
	STUDY AREA

NOTE:

1. ASBESTOS GLAZING PUTTY IS PRESENT ON INTERIOR SIDES OF WINDOW MUNTINS AND ASBESTOS CAULKING IS PRESENT ON EXTERIOR SIDES OF WINDOW FRAMES ON ALL WINDOWS IN THE STUDY AREAS.

REVISIONS:

No.	Date:	By:	Revisions

REFERENCE:

ARCADIS

CONSEIL SCOLAIRE VIAMONDE

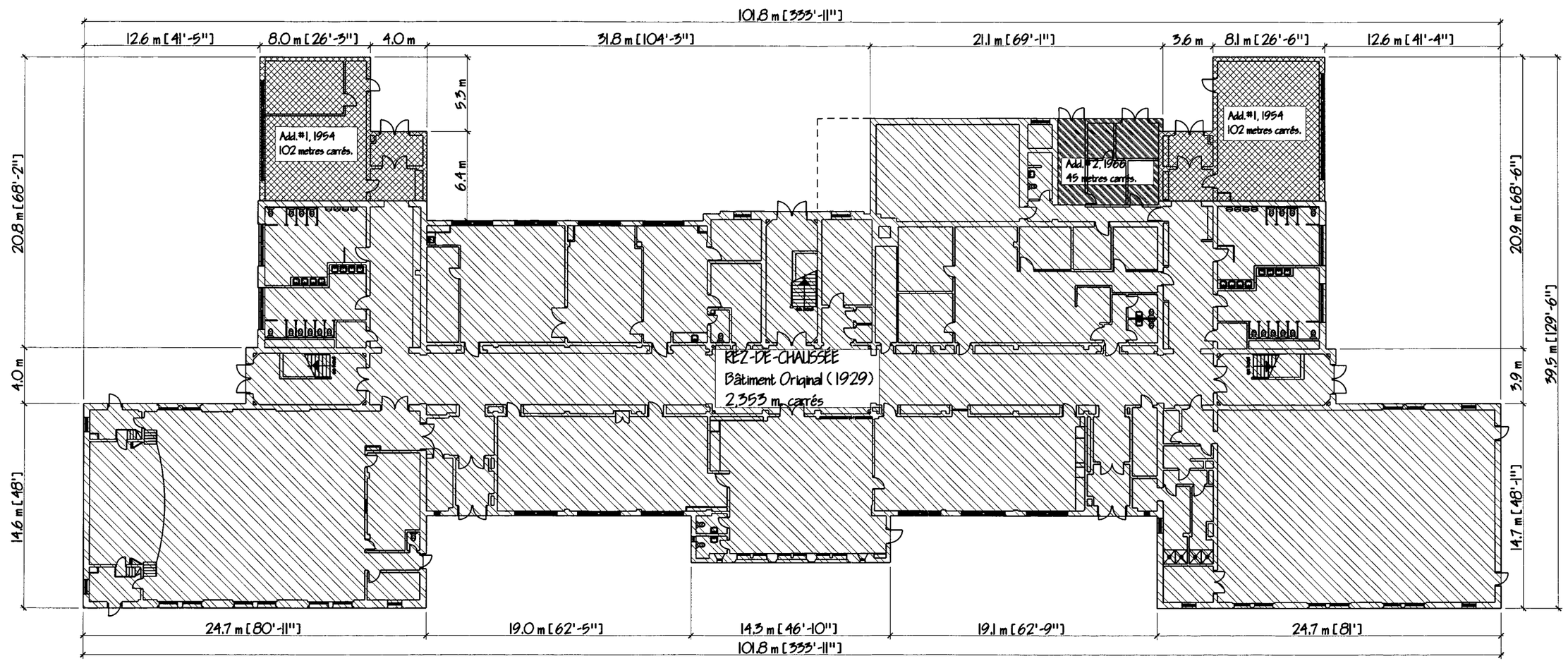
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

LOCATIONS OF ASBESTOS-CONTAINING MATERIALS AND STUDY AREA

ÉCOLE ÉLÉMENTAIRE GABRIELLE ROY
14 PEMBROKE STREET, TORONTO

THIRD FLOOR PLAN

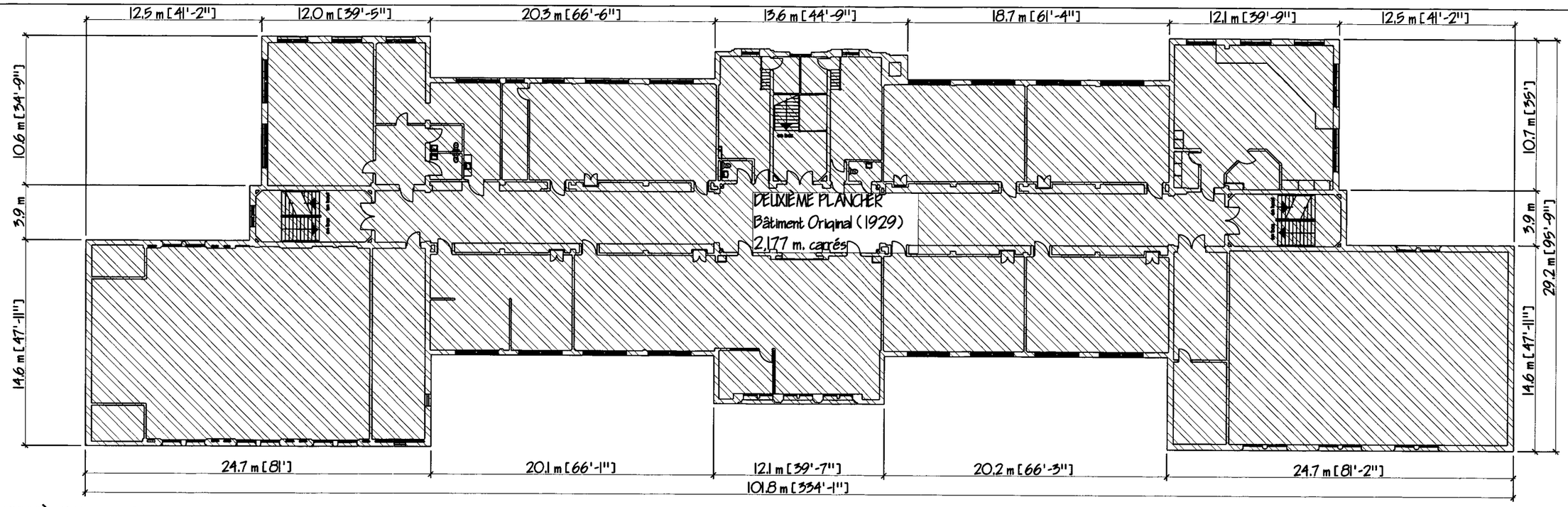
Drawn By: A.N.	Approved By: J.D.	Project No: 30246134
Date: JAN 2025	Scale: N.T.S	Drawing No: 30246134-2



REZ-DE-CHAUSSÉE

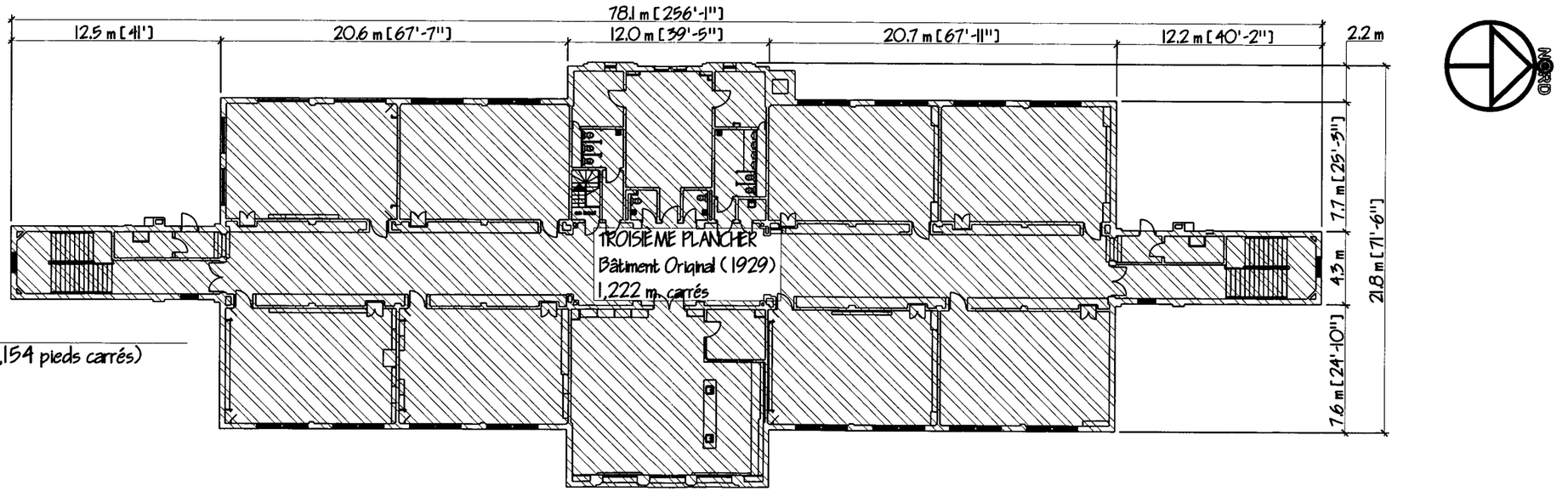
Superficie brute : 2,602 metres carrés (28,009 pieds carrés)

ÉDIFICE:	École GABRIELLE-ROY; plan REZ-DE-CHAUSSÉE		
projet:	dossier Recapp 2003		
nom du dessin:	plan superficies et additions	échelle:	: 300
chemin d'accès :	X:/ DanP/ AutoCAD/ plans d'écoles/ 01. Gabrielle-Roy_superficies.dwg		
CONSEIL SCOLAIRE de DISTRICT du CENTRE-SUD-OUEST 116 Cornelius Parkway, Toronto (Ontario) M6L 2K5 Secteur d'immobilisation de l'entretien et de la planification; SIEP		dessiné par: DP	dessin no.:
		date: avril 2003	



DEUXIÈME PLANCHER

Superficie brute : 2,177 metres carrés (23,434 pieds carrés)



TROISIÈME PLANCHER

Superficie brute : 1,222 metres carrés (13,154 pieds carrés)

SUPERFICIE TOTALE ÉDIFICE: 6,001 metres carrés (64,597 pieds carrés)

ÉDIFICE:	École GABRIELLE-ROY; plan DEUXIÈME et TROISIÈME PLANCHER		
projet:	dossier Recapp 2003		
nom du dessin:	plan superficies et additions	échelle:	1 : 300
chemin d'accès :	X:/ DanP/ AutoCAD/ plans d'écoles/ 01. Gabrielle-Roy_superficies.dwg		
CONSEIL SCOLAIRE de DISTRICT du CENTRE-SUD-OUEST 116 Cornelius Parkway, Toronto (Ontario) M6L 2K5 Secteur d'immobilisation de l'entretien et de la planification: SIEP		dessiné par: DP	dessin no.:
		date: avril 2003	

Appendix B

Laboratory Reports

EMSL Canada Inc.

20 Amber Street Unit #16 Markham, ON L3R 5P4
Phone/Fax: (289) 271-4362 / (289) 799-3563
http://www.EMSL.com / markhamlab@EMSL.com

EMSL Canada Order 662400390
Customer ID: 55DCSL97
Customer PO: 30246134
Project ID:

Attn: Dwayne Kellyman
ARCADIS Canada Inc.
55 St. Clair Avenue West, 7th Floor
Toronto, ON M4V 2Y7

Phone: (905) 882-5984
Fax: (905) 882-8962
Collected:
Received: 11/08/2024
Analyzed: 11/15/2024

Proj: École élémentaire Gabrielle-Roy DSS/30246134

Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Client Sample ID: 1A **Lab Sample ID:** 662400390-0001
Sample Description: Gypsum block/Room A-1

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	11/15/2024	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 1B **Lab Sample ID:** 662400390-0002
Sample Description: Gypsum block/Room A-1

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	11/15/2024	Gray/Beige	0.0%	100.0%	None Detected	

Client Sample ID: 1C **Lab Sample ID:** 662400390-0003
Sample Description: Gypsum block/Room A-1

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	11/15/2024	Gray/Beige	0.0%	100.0%	None Detected	

Client Sample ID: 2A **Lab Sample ID:** 662400390-0004
Sample Description: Window Putty/Room A-1

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	11/15/2024	Beige	0.0%	98.0%	**2% Chrysotile**	

Client Sample ID: 2B **Lab Sample ID:** 662400390-0005
Sample Description: Window Putty/Room A-1

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	11/15/2024				Positive Stop (Not Analyzed)	

Client Sample ID: 2C **Lab Sample ID:** 662400390-0006
Sample Description: Window Putty/Room A-1

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	11/15/2024				Positive Stop (Not Analyzed)	

Client Sample ID: 3A **Lab Sample ID:** 662400390-0007
Sample Description: Parging cement in ceiling vent penetration/Room A-1

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	11/15/2024	Gray	0.0%	35.0%	**65% Chrysotile**	

EMSL Canada Inc.

20 Amber Street Unit #16 Markham, ON L3R 5P4
Phone/Fax: (289) 271-4362 / (289) 799-3563
http://www.EMSL.com / markhamlab@EMSL.com

EMSL Canada Order 662400390
Customer ID: 55DCSL97
Customer PO: 30246134
Project ID:

Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Client Sample ID: 3B ***Lab Sample ID:*** **662400390-0008**

Sample Description: Parging cement in ceiling vent penetration/Room A-1

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	11/15/2024			Positive Stop (Not Analyzed)		

Client Sample ID: 3C ***Lab Sample ID:*** **662400390-0009**

Sample Description: Parging cement in ceiling vent penetration/Room A-1

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	11/15/2024			Positive Stop (Not Analyzed)		

Analyst(s):

Javed Ishmail PLM (1)
Marzan Regaspi PLM (4)

Reviewed and approved by:

S. Achaiya

Stephanie Achaiya, Laboratory Manager
or Other Approved Signatory

None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This is a summary report; official reports are available on LabConnect or upon request and relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Canada Inc. Markham, ON NVLAP Lab Code 600317-0

Initial report from: 11/15/202417:52:51

EMSL Canada Inc.
2756 Slough Street, Mississauga, ON L4T 1G3
Phone/Fax: (289) 997-4602 / (289) 997-4607
http://www.EMSL.com torontolab@emsl.com

EMSL Canada Or	552418264
CustomerID:	55DCSL97B
CustomerPO:	30246134
ProjectID:	

Attn: **Dwayne Kellyman**
Arcadis Canada Inc.
8133 Warden Ave, Unit 300
Markham, ON L6G 1B3

Phone: (905) 940-6161
Fax:
Received: 11/11/2024 09:59 AM
Collected: 11/8/2024

Project: **ecole elementaire gabrielle roy/ 30246134**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

Client SampleDescription	*Collected*	*Analyzed*	*Weight*	*RDL*	*Lead Concentration*
P-1	11/8/2024	11/12/2024	0.2490 g	16000 ppm	250000 ppm
552418264-0001	Site: Attic A-1 Black Paint on steel				

Rowena Fanto, Lead Supervisor
or other approved signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.
* Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.008% wt based on the minimum sample weight per our SOP. "<" (less than) result signifies the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. Definitions of modifications are available upon request.
Samples analyzed by EMSL Canada Inc. Mississauga, ON AIHA LAP, LLC-ELLAP Accredited #196142

Initial report from 11/18/2024 09:06:51

Appendix C

Summary of Asbestos, Lead and Silica Work Classifications

TABLE C-1
SUMMARY OF CLASSIFICATION OF TYPE 1, 2 AND 3 OPERATIONS (Ont. Reg. 278/05)

TYPE 1 OPERATIONS

- removing less than 7.5 m^2 asbestos-containing ceiling tiles;
- removing non-friable asbestos-containing material other than ceiling tiles, if the material is removed without being broken, cut, drilled, abraded, ground, sanded or vibrated;
- breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the material is wetted and the work is done only using non-powered, hand-held tools; and
- removing less than 1 m^2 of drywall in which asbestos-containing joint compounds have been used.

TYPE 2 OPERATIONS

- removing all or part of a false ceiling to obtain access to a work area, if asbestos-containing material is likely to be lying on the surface of the false ceiling;
- removal of one square metre or less of friable asbestos-containing material;
- enclosing friable asbestos-containing material;
- applying tape or a sealant or other covering to asbestos-containing pipe or boiler insulation;
- removing 7.5 m^2 or more asbestos-containing ceiling tiles (if removed without being broken, cut, drilled, abraded, ground, sanded or vibrated);
- breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the material is not wetted and the work is done only using non-powered, hand-held tools;
- removal of one square metre or more of drywall in which asbestos-containing joint compounds have been used;
- breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the work is done using power tools that are attached to dust-collecting devices equipped with HEPA filters;
- cleaning or removing filters used in air-handling equipment in a building that has asbestos-containing sprayed fireproofing.

TABLE C-1 (Continued)
SUMMARY OF CLASSIFICATION OF TYPE 1, 2 AND 3 OPERATIONS (Ont. Reg. 278/05)

TYPE 3 OPERATIONS

- removal of more than one square metre of friable asbestos-containing material;
- spray application of a sealant to friable asbestos-containing material;
- cleaning or removing air-handling equipment, including rigid ducting but not including filters, in a building that has sprayed asbestos-containing fireproofing;
- repairing or demolishing a kiln, metallurgical furnace or similar structure that is made in part of asbestos-containing refractory materials;
- breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing materials, if the work is done using power tools that are not attached to dust-collecting devices equipped with HEPA filters.

TABLE C-2
SUMMARY OF CLASSIFICATION OF LEAD-CONTAINING CONSTRUCTION TASKS
MOL GUIDELINE – LEAD ON CONSTRUCTION PROJECTS, APRIL 2011

Type 1 Operations	Type 2 Operations		Type 3 Operations	
	Type 2a	Type 2b	Type 3a	Type 3b
<0.05 mg/m^3	>0.05 to 0.50 mg/m^3	>0.50 to 1.25 mg/m^3	>1.25 to 2.50 mg/m^3	>2.50 mg/m^3

Note: The classification of Type 1, 2 and 3 operations is based on presumed airborne concentrations of lead, as shown above.

TYPE 1 OPERATIONS

- application of lead-containing coatings with a brush or roller;
- removal of lead-containing coatings with a chemical gel or paste and fibrous laminated cloth wrap;
- removal of lead-containing coatings or materials using a power tool that has an effective dust collection system equipped with a HEPA filter;
- installation or removal of lead-containing sheet metal;
- installation or removal of lead-containing packing, babbit or similar material;
- removal of lead-containing coatings or materials using non-powered hand tools, other than manual scraping or sanding;
- soldering.

TYPE 2 OPERATIONS

Type 2a Operations

- welding or high temperature cutting of lead-containing coatings or materials outdoors. This operation is considered a Type 2a operation only if it is short-term, not repeated, and if the material has been stripped prior to welding or high temperature cutting. Otherwise it will be considered a Type 3a operation;
- removal of lead-containing coatings or materials by scraping or sanding using non-powered hand tools;
- manual demolition of lead-painted plaster walls or building components by striking a wall with a sledgehammer or similar tool.

Type 2b Operations

- spray application of lead-containing coatings.

TABLE C-2 (Continued)
SUMMARY OF CLASSIFICATION OF LEAD-CONTAINING CONSTRUCTION TASKS
MOL GUIDELINE – LEAD ON CONSTRUCTION PROJECTS, APRIL 2011

TYPE 3 OPERATIONS

Type 3a Operations

- welding or high temperature cutting of lead-containing coatings or materials indoors or in a confined space;
- burning of a surface containing lead;
- dry removal of lead-containing mortar using an electric or pneumatic cutting device;
- removal of lead-containing coatings or materials using power tools without an effective dust collection system equipped with a HEPA filter;
- removal or repair of a ventilation system used for controlling lead exposure;
- demolition or cleanup of a facility where lead-containing products were manufactured;
- an operation that may expose a worker to lead dust, fume or mist that is not a Type 1, Type 2, or Type 3b operation

Type 3b Operations

- abrasive blasting of lead-containing coatings or materials;
- removal of lead-containing dust using an air mist extraction system.

TABLE C-3

SUMMARY OF CLASSIFICATION OF SILICA-CONTAINING CONSTRUCTION TASKS

MOL GUIDELINE, SILICA ON CONSTRUCTION PROJECTS, APRIL 2011

	Type 1 Operations	Type 2 Operations	Type 3 Operations
Cristobalite and Tridymite	>0.05 to 0.50 mg/m^3	>0.50 to 2.50 mg/m^3	>2.5 mg/m^3
Quartz and Tripoli	>0.10 to 1.0 mg/m^3	>1.0 to 5.0 mg/m^3	>5.0 mg/m^3

Note: The classification of silica-containing construction tasks is based on presumed concentrations of respirable crystalline silica, as shown above.

TYPE 1 OPERATIONS

- The drilling of holes in concrete or rock that is not part of a tunnelling operation or road construction.
- Milling of asphalt from concrete highway pavement.
- Charging mixers and hoppers with silica sand (sand consisting of at least 95 per cent silica) or silica flour (finely ground sand consisting of at least 95 per cent silica).
- Any other operation at a project that requires the handling of silica-containing material in a way that may result in a worker being exposed to airborne silica.
- Entry into a dry mortar removal or abrasive blasting area while airborne dust is visible for less than 15 minutes for inspection and/or sampling.
- Working within 25 metres of an area where compressed air is being used to remove silica-containing dust outdoors.

TYPE 2 OPERATIONS

- Removal of silica containing refractory materials with a jackhammer.
- The drilling of holes in concrete or rock that is part of a tunnelling or road construction.
- The use of a power tool to cut, grind, or polish concrete, masonry, terrazzo or refractory materials.
- The use of a power tool to remove silica containing materials.
- Tunnelling (operation of the tunnel boring machine, tunnel drilling, tunnel mesh installation).
- Tuckpoint and surface grinding.
- Dry mortar removal with an electric or pneumatic cutting device.
- Dry method dust cleanup from abrasive blasting operations.
- The use of compressed air outdoors for removing silica dust.
- Entry into area where abrasive blasting is being carried out for more than 15 minutes.

TABLE C-3 (Continued)
SUMMARY OF CLASSIFICATION OF SILICA-CONTAINING CONSTRUCTION TASKS
MOL GUIDELINE, SILICA ON CONSTRUCTION PROJECTS, APRIL 2011

TYPE 3 OPERATIONS

- Abrasive blasting with an abrasive that contains ≥ 1 per cent silica.
- Abrasive blasting of a material that contains ≥ 1 per cent silica.

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Appendix B

Asbestos Abatement Specifications

ASBESTOS ABATEMENT SPECIFICATIONS
École élémentaire Gabrielle-Roy

TABLE OF CONTENTS

At Rear:

Drawing No 30246134-1 - Locations of Work Areas – Attic Floor Plan

1.0 PART 1 – GENERAL

1.1 GENERAL

.1 The requirements as set out in these specifications may, at times, exceed the procedures detailed in the various applicable regulations. All work shall be done in compliance with the specifications AND the regulations. Should there be any discrepancy or conflict between the documents, the most stringent shall apply.

1.2 ASBESTOS ABATEMENT OUTLINE OF WORK

.1 The intent of the work is to remove, and dispose select accessible asbestos-containing materials, to the extent practicable, prior to building renovation operations.

.2 Replacement of the removed materials is not part of this contract unless otherwise noted.

.3 Coordinate all work with the General Contractor and sub trades as required.

.4 Scheduling requirements:

.1 All asbestos abatement work must be completed by the end of May 2025. All work must be performed either after school hours or on weekends.

.5 Provide all supervision, labour, equipment, tools, materials, waste management, haulage and disposal, and other services, as required, for undertaking and completing all of the work, as detailed below.

.6 **Work Area 1 – Attic A1**

.1 Prepare the area as indicated above and on the attached floor plan for Type 2/Glovebag asbestos removal operations.

.2 Using glovebags, remove and dispose as asbestos waste all asbestos-containing thermal insulation applied to pipe straight sections and pipe fittings within reach of catwalks and temporary platforms.

.3 Supply and install canvas and lagging to encapsulate exposed ends of remaining asbestos-containing thermal insulation on piping adjacent to areas where thermal insulation was removed.

.4 For costing purposes, allow for the removal of thermal insulation from sixty (60) pipe fittings and the removal of twenty (20) linear metres of 4” diameter pipe straight insulation, twenty-five (25) linear metres of 5” diameter pipe straight insulation, ten (10) linear metres of 6” diameter pipe straight insulation, twenty (20) linear metres of 7” diameter pipe straight insulation, fifteen (15) linear metres of 8” diameter pipe straight insulation, and fifteen (15) linear metres of 10” diameter pipe straight insulation.

.7 **Work Area 2 – Attic A1 (Partial)**

.1 Prepare the area as indicated above and on the attached floor plan for a Type 2 Enclosure asbestos removal operation.

.2 Supply and install ladders and/or scaffolding in accordance with all applicable regulations, in order to provide sufficient and safe access to the work area.

.3 Remove and dispose as asbestos waste, all asbestos-containing cementitious parging material around the perimeter of the exhaust duct where it penetrates the roof decking.

.8 Thermal insulation on pipe fittings contains 35% chrysotile asbestos. Thermal insulation ("Air-Cell" type) on pipe straights contains 65% chrysotile asbestos. Cementitious parging material contains 65% chrysotile asbestos.

.9 All waste is to be removed from the site and disposed. Asbestos waste disposal bins are not to be left on School property unless fully enclosed with an integral metal roof system and locked. Disposal bins must be removed immediately on completion of work.

.10 Schedule

.1	Mobilization	To be Coordinated with the General Contractor
.2	Complete Work and Demobilization	To be Coordinated with the General Contractor

1.3 GENERAL REQUIREMENTS

.1 The location and availability of utilities including water, sewer and electrical power is to be determined on site. The Asbestos Contractor shall co-operate with all others on site. Should there be any disagreement, or should Contractors be unable to reach a satisfactory working arrangement, the Arcadis Professional Services (Canada) Inc. Consultant shall determine the manner for proceeding. The Asbestos Contractor shall not be entitled to any additional payment.

.2 The Asbestos Contractor is responsible for all electrical connects and disconnects. All work must be performed by a licensed electrician in compliance to all regulatory requirements and codes.

.3 The Asbestos Contractor is responsible for making all arrangements, and for paying for the disposal of all waste materials in accordance to all applicable government laws and regulations including local, provincial and federal.

.4 The Asbestos Contractor is advised that extended hours of work may be required to meet the schedules as detailed in the Scope of Work and shall allow for the cost thereof including shift premiums and overtime. The Arcadis Professional Services (Canada) Inc. Consultant shall be advised in writing at least four days in advance of the proposed working hours.

.5 The Asbestos Contractor shall furnish and post on site the name and current phone number of an authorized representative(s) who can be contacted on a 24-hour basis in case of an emergency.

.6 All precautions will be taken to prevent the spread of contaminated material and to protect all parties including Asbestos Contractor's personnel, Owner's employees and the public from asbestos dust exposure during the course of the work. The documents outline the minimum levels of precaution to be taken.

.7 All work in work areas that are confined spaces shall comply with all requirements respecting confined spaces specified in O. Reg. 632/05, as amended 346/15, November 26, 2015.

.8 **All work shall be done in compliance with the specifications and the Ontario Regulation 278/05 – *Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations* – made under the *Occupational Health and Safety Act***. Should there be any discrepancy or conflict between the documents, the most stringent shall apply.

.9 Contract conditions include, but are not limited to, complying with all Regulations, taking all precautions necessary to control the release of asbestos fibres within the work areas, preventing the release of asbestos fibres outside the work areas, and providing appropriate protection from exposure to asbestos fibres for all parties. Failure to meet any of these conditions will be considered a fundamental breach of the Contract.

.10 The Arcadis Professional Services (Canada) Inc. Consultant will visit the site at his/her discretion to familiarize himself/herself with the progress and quality of the Work and to determine if the Work is proceeding in accordance with the Contract Documents.

.11 The Arcadis Professional Services (Canada) Inc. Consultant shall have the authority to immediately stop the Work through a written instruction if, in his opinion, the Work does not conform to the requirements of the Contract Documents, or if continuance of the Work could subject the Owner, his employees or the public to a hazardous condition. The Work shall not recommence until such time as the deficiency or hazardous situation has been corrected and a written notice to proceed has been issued by the Arcadis Professional Services (Canada) Inc. Consultant.

.12 If the Asbestos Contractor fails to comply with requirements dealing with the control of asbestos fibres and the health and safety of Asbestos Contractor employees, Arcadis Professional Services (Canada) Inc. Consultant and Owner personnel or the Public, the Owner, or the Owner's representative, may verbally instruct the Asbestos Contractor to cease work immediately with written confirmation to follow within two working days. If the Arcadis Professional Services (Canada) Inc. Consultant gives a written statement to the Owner and the Asbestos Contractor that sufficient cause exists, the Owner may notify the Asbestos Contractor in writing that he is in default of his contractual obligations.

.13 Any employee shall be replaced, at the written request of the Arcadis Professional Services (Canada) Inc. Consultant, if working, or causing others to work, in violation of O.Reg. 278/05.

.14 The Asbestos Contractor's insurance coverage limits, per occurrence, shall equal or exceed the following and shall name the Owner, the General Contractor and Arcadis Professional Services (Canada) Inc. as additional insureds:

.1 General Liability $5 million;

.2 Automotive Liability $2 million;

.3 Pollution Liability $5 million including asbestos operations.

.15 The supervisor must have proven experience and proficiency in the type of Work being undertaken under this Contract.

.16 The supervisor shall be replaced, at the written request of the Arcadis Professional Services (Canada) Inc. Consultant, if found to be incompetent or inattentive to the needs of the project.

.17 Where standards of performance are specified or implied and the Work does not comply with the performance specified or implied, such deficiencies shall be corrected as directed by the Arcadis Professional Services (Canada) Inc. Consultant. Any subsequent testing shall be done at the Asbestos Contractor's expense.

1.4 DEFINITIONS

.1 *HEPA Vacuum:*

.1 High Efficiency Particulate Aerosol (HEPA) filtered vacuum equipment acceptable to Health and Welfare Canada and meeting U.S. Military Standard 282. This vacuum equipment shall have a filtering system capable of collecting and retaining asbestos fibres to an efficiency of 99.97% for fibres of 0.3 micrometer or larger.

.2 *Polyethylene sheeting sealed with tape:*

.1 Polyethylene sheeting of thickness specified sealed with tape along all edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from water damage or damage by sealants, and to prevent escape of asbestos fibres through the sheeting into a clean area.

.3 *Inspector:*

.1 Representative of Arcadis Professional Services (Canada) Inc. designated by the owner to provide inspection and air monitoring of the Contractor's work.

.4 *Authorized Visitor:*

.1 Representative of the building owner, Arcadis Professional Services (Canada) Inc., and/or persons representing regulatory agencies.

.5 *Amended Water:*

.1 Water with a non-ionic surfactant added to reduce water tension to allow thorough wetting of asbestos fibres.

.6 *Airlock:*

.1 A system for permitting ingress or egress without permitting air movement between a contaminated area and an uncontaminated area typically consisting of two curtained doorways at least 1.5 m apart.

.7 *Curtained Doorways:*

.1 An arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed by placing two overlapping sheets of polyethylene over an existing or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one sheet along one vertical side of the doorway and securing the vertical edge of the other sheet along the opposite vertical side of the doorway.

.2 All free edges of polyethylene shall be reinforced with duct tape and the bottom edge shall be weighted to ensure proper closing. Each polyethylene sheet shall overlap openings an additional 1/3 of the doorway width.

.8 *Operating Area:*

.1 Area where no removal or repair Work is underway.

.9 *Clean Area:*

.1 Either an operating area or an area in which removal Work has already been completed.

.10 *Work Area:*

.1 Where the actual removal of asbestos-containing materials take place.

.11 *Negative Pressure:*

.1 A system which extracts air from the work area and discharges this air directly outside the building, sufficient to maintain a minimum pressure differential of 0.5 mm (0.02 inch) of water column relative to adjacent areas outside of work areas. This

air extraction system is to be equipped with a High Efficiency Particulate Aerosol filtering system before discharge.

.12 *Confined Space:*

.1 A fully or partially enclosed space,

.1 that is not both designed and constructed for continuous human occupancy, and

.2 in which atmospheric hazards may occur because of its construction, location or contents or because of work that is done in it.

1.5 REGULATORY AGENCIES

.1 Comply with Federal, Provincial, and local requirements pertaining to asbestos, provided that in any case of conflict among those requirements or with these Specifications the more stringent requirement shall apply. These include, but are not limited to, the following:

.1 Ontario Ministry of Labour, Occupational Health and Safety Division, *Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations*, O. Reg. 278/05, as amended 62/18, March 2, 2018 – made under the *Occupational Health and Safety Act, R.S.O. 1990, c. E. 19, as amended.*

.2 Ontario Ministry of the Environment *Regulation 347* under the Environmental Protection Act, 19 as amended by O. Reg. 509/21, June 30, 2021.

.2 Government of Canada *Regulations Respecting the Handling, Offering for Transport and Transporting of Dangerous Goods*. (Extract from the Canada Gazette Part II, dated February 6, 1985.)

.3 Government of Ontario *Occupational Health and Safety Act, -R.S.O. 1990, c. E. 19, as amended, and Regulations for Construction Projects* O. Reg. 213/91, as amended.

.4 Office of the Fire Commissioner of Canada.

.5 Ontario Electrical Safety Code.

.6 Government of Ontario, Building Code O. Reg. 332/12, as amended 137/19, May 2, 2019.

.2 *Patents:*

.1 It shall be the Contractor's responsibility to ensure that all applicable patent laws are complied with.

1.6 FIRE SAFETY PLAN

.1 Prior to initiating any work on the site, the Contractor shall prepare and submit in writing to the Engineer a Fire Safety Plan. The Plan shall be in accordance to the requirements set forth in Section 2.14, Construction and Demolition Sites, of the National Fire Code and shall include:

.1 the designation and organization of site personnel to carry out fire safety duties, including fire water services if applicable;

.2 the emergency procedures to be used in the case of fire, including:

.1 sounding the fire alarm;

.2 notifying the fire department;

.3 instructing site personnel on procedures to be followed when the alarm sounds; and

.4 firefighting procedures;

.3 the control of fire hazards in and around the building;

.4 maintenance of firefighting facilities; and

.5 special requirements as may be identified by the building owner.

.2 Implementation of the Fire Safety Plan shall be the sole responsibility of the Contractor, and the above shall, in no way, limit the Contractor's statutory and regulatory obligations. During the work, the Fire Safety Plan shall be prominently displayed at the site and its requirements included in site safety training and awareness programs.

1.7 SUBMITTALS

1.7.1 Submittals Before Commencing Work

.1 The following documentation shall be submitted to the Inspector with a dated covering letter listing attachments a minimum 48 hours prior to commencement of the Work:

.1 *Permits and Notifications:*

.1 All necessary permits for transporting and disposal of asbestos waste. Submit proof satisfactory to Inspector that suitable arrangements have been made to receive and properly dispose of asbestos waste. Copies of all Notifications required by Section 1.11.

.2 *Safety Data Sheets:*

.1 Safety Data Sheets, or equivalent, for any sealant, surfactant or other material proposed for use. Include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated.

.3 *Supervisory Personnel:*

.1 Names of supervisory personnel who will be responsible for work area(s). **One of these supervisors must remain on site at all times asbestos removal or cleanup is occurring**. Submit proof that supervisory personnel have over 2000 hours experience on asbestos abatement projects, have performed supervisory functions on at least two other asbestos projects and have achieved the level of training as set out by the Regulation.

.4 *Schedule:*

.1 Provide a bar chart indicating planned progress for critical activities as required under **Scope of Work** as well as additional information listed below a minimum of 48 hours prior to commencement of any preparatory work indicating:

.1 shifts to be worked;

.2 proposed workforce;

.3 starting date;

.4 estimated date of commencement of asbestos removal;

.5 estimated date of completion of asbestos removal;

.6 estimated completion date.

.5 *Insurance:*

.1 Provide a Certificate signed by the insurance agency naming the Owner, the General Contractor and Arcadis Professional Services (Canada) Inc. as co-insureds.

2. The Asbestos Contractor's insurance coverage limits, per occurrence, shall equal or exceed the following:

.1 General Liability $5 million;

.2 Automotive Liability $2 million;

.3 Pollution Liability $5 million including asbestos operations.

.3 The Asbestos Contractor must provide thirty (30) days' notice of cancellation or amendment of coverage.

.6 *Fire Safety Plan*:

.1 In accordance to Article 1.6 above.

.7 *Confined Space:*

.1 If a work area, or part thereof, is a confined space, the contractor shall submit:

.1 a co-ordination document (see Section 1.13.1.1);

.2 a written program (see Section 1.13.1.2);

.3 a written plan (see Section 1.13.1.4).

.8 *Asbestos Training:*

.1 A letter certifying that:

(a) every worker involved in a Type 3 operation has successfully completed the Asbestos Abatement Worker Training Program approved by the Ministry of Training, Colleges and Universities; and

(b) every supervisor of a worker involved in a Type 3 operation has successfully completed the Asbestos Abatement Supervisor Training Program approved by the Ministry of Training, Colleges and Universities. O.Reg. 278/05, s. 20(1).

1.7.2 Submittals Before Commencing Asbestos Removal

.1 Proposed Work Area emergency exit procedures.

1.7.3 Submittals Upon Completion of Work

.1 Asbestos waste haulage and disposal documentations including Bills of Lading, waste transfer documents and dump receipts.

.2 All documentation as specified in the contract General Conditions including, but not limited to, Workplace Safety and Insurance Board Certificate, Statutory Declarations and Proof of Publication of Substantial Performance.

1.8 EXISTING CONDITIONS

.1 Thermal insulation on pipe fittings contains 35% chrysotile asbestos. Thermal insulation ("Air-Cell" type) on pipe straights contains 65% chrysotile asbestos. Cementitious parging materials contains 65% chrysotile asbestos.

.2 Existing conditions are documented in a report prepared by Arcadis Professional Services (Canada) Inc. for the Conseil scolaire Viamonde titled "*Pre-Renovation Designated Substances and Hazardous Materials Survey, École élémentaire Gabrielle-Roy, 14 Pembroke Street, Toronto, Ontario*", dated January 31, 2025, which is included with the tender documents.

.3 Masonry applications may contain silica. Paint applications contain lead and may contain mercury. Appropriate dust control procedures and respiratory protective equipment are to be used if disturbing these materials.

1.9 RESTRICTIONS

.1 Do not allow smoking, eating or drinking in the work area.

.2 Do not allow entry to work area by unauthorized persons.

.3 Compressed air shall not be used in the work area.

.4 Open flames will not be permitted in the work area (including but not limited to torches and propane-fired heaters).

1.10 WORKER PROTECTION

.1 *Instructions:*

.1 Before commencing Work, instruct workers in all aspects of work procedures and protective measures.

.2 *Respiratory Protection:*

.1 Provide workers with personally issued and marked respiratory equipment acceptable to the Occupational Health and Safety Division of the Ontario Ministry of Labour, suitable for the asbestos exposure in the work area.

.2 Ensure that suitable respiratory protective equipment is worn by every worker who enters the work area. A respirator provided by an employer and used by a worker:

.1 shall be in accordance to O.Reg. 278/05, Section 13, respirators;

.2 shall be fitted so that there is an effective seal between the respirator and the worker's face;

.3 shall be assigned to a worker for the worker's exclusive use;

.4 shall be used and maintained in accordance with the procedures specified by the equipment manufacturer;

.5 shall be cleaned, disinfected and inspected after use on each shift, or more often if necessary;

.6 shall have damaged or deteriorated parts replaced prior to being used by a worker; and

.7 when not in use, shall be stored in a convenient, clean and sanitary location.

.3 *Protective Clothing:*

.1 Provide workers with protective clothing which shall:

.1 be worn by every worker who enters the work area;

.2 be made of a material which does not readily retain nor permit penetration of asbestos fibres;

.3 consist of full body covering including head covering with snug fitting cuffs at the wrists, ankles and neck;

.4 include suitable footwear; and

.5 be repaired or replaced if torn.

1.11 NOTIFICATIONS

.1 Notify, in writing, the local Fire Department of the extent of the work, including a copy of the Fire Safety Plan detailed in Article 1.6 above.

.2 Notify, orally and in writing, an inspector at the office of the Ministry of Labour nearest the work place of the operation. O.Reg. 278/05, Section 11.

.1 The written notice required by subsection (1) shall set out:

.1 the name and address of the person giving the notice;

.2 the name and address of the owner of the place where the work will be carried out;

.3 the municipal address or other description of the place where the work will be carried out sufficient to permit the inspector to locate the place, including the location with respect to the nearest public highway;

.4 a description of the work that will be carried out;

.5 the starting date and expected duration of the work; and

.6 the name and address of the supervisor in charge of the work.

.3 Notify the Inspector a minimum of eight hours prior to initiation of the following phases of the project:

.1 commencement of asbestos removal;

.2 commencement of sealant application;

.3 dismantling of the enclosure; and

.4 removing asbestos waste from the work area.

1.12 PROTECTION, REPAIR AND REPLACEMENT OF EQUIPMENT AND MATERIALS

.1 All equipment within and surrounding the work area shall be suitably protected by the Contractor during the work periods.

.2 All equipment damaged by the Contractor shall be replaced by the Contractor at no additional cost to the Owner.

1.13 CONFINED SPACES

.1 If any work area, or part thereof, is a confined space, the contractor shall comply with all requirements respecting confined spaces specified in O. Reg. 632/05, as amended 346/15, November 26, 2015, including but not limited to:

.1 preparation of a co-ordination document;

.2 development of a written program;

.3 assessment of hazards;

.4 development and implementation of an adequate written plan;

.5 provision of adequate worker training; and

.6 issuance of entry permits.

.2 The contractor shall perform adequate air tests while a worker is in a confined space to ensure that acceptable atmospheric levels are maintained in the confined space, including during any inspections and during final clearance air monitoring performed by Arcadis Professional Services (Canada) Inc.

.3 The contractor shall provide an attendant for communications and rescue response whenever a worker is to enter a confined space, including during inspections and final clearance air monitoring by Arcadis Professional Services (Canada) Inc.

.4 The contractor shall provide Arcadis Professional Services (Canada) Inc. with calibration records for air testing equipment and copies of all records of atmospheric monitoring of confined space.

.5 The co-ordination document (see Section 1.13.1.1) shall refer to the contractor's responsibilities for air testing, communications and rescue response specified in Sections 1.13.2 and 1.13.3, above.

2.0 PART 2 – PRODUCTS

2.1 MATERIALS

.1 *Polyethylene:*

.1 In 0.15 mm (6 mil) minimum thickness unless otherwise specified; in sheet size to minimize joints.

.2 *Tape:*

.1 Reinforced duct tape suitable for sealing polyethylene under both wet conditions using amended water, and dry conditions.

.3 *Wetting Agent:*

.1 50% polyoxethylene ester and 50% polyglycol or polyxyethylene ether, or equivalent approved product, and shall be mixed with water to a concentration to provide adequate penetration and wetting of asbestos-containing material.

.4 *Asbestos Waste Receptors:*

.1 0.15 mm (6 mil) minimum thickness appropriately labelled, sealable polyethylene bags and 0.15 mm (6 mil) minimum thickness sealable clear polyethylene bags.

.5 *Rip-Proof Polyethylene:*

.1 0.20 mm (8 mil) fabric made up from 0.13 mm (5 mil) weave and 2 layers 0.04 mm (1.5 mil) poly laminate, in sheet size to minimize joints.

.6 *Sealant:*

.1 Slow-drying sealant which remains tacky on surface for a minimum of 8 hours for purpose of trapping residual airborne fibre during settling period. Product must have flame spread and smoke development ratings both less than 50. **Product shall leave a clear finish when dry. Acceptable products "Childers Chil-Lock CP-240" or equivalent.**

2.2 EQUIPMENT

.1 All equipment brought on site must be thoroughly clean and free of all fibre, asbestos or otherwise, to the satisfaction of the Field Inspector. The Contractor will be fully responsible for the replacement of equipment rejected by the Inspector and for all costs resulting from site contamination due to dirty or faulty equipment.

.2 *Airless Sprayer:*

.1 Spray equipment for the application of amended water and sealant such as Graco Hydrospray or equivalent:

.1 Fine atomizing spray nozzle: Nozzle for airless sprayer capable of delivering not less than 4.5 L per minute of fine particle spray of amended water.

.3 *Garden Sprayer:*

.1 Hand pump-type pressure-can garden sprayer fabricated out of either metal or plastic equipped with a wand at the end of a hose that can deliver a stream or spray of liquid under pressure. **Only to be used on small removal and repair projects with the approval of the site inspector.**

.4 *HEPA Vacuum:*

.1 High Efficiency Particulate Aerosol filtered vacuum equipment. Must have a filtering system capable of collecting and retaining asbestos fibres to an efficiency of 99.97% for fibres of 0.3 um or larger. HEPA filters must have been individually tested and certified by the manufacturer.

.2 All HEPA vacuums brought onto the job site shall be visibly clean, shall be in a good state of repair and shall be maintained in such state through completion of the project.

.5 *Glovebag:*

.1 Prefabricated, purposely made, 0.20 mm minimum thickness, polyvinyl chloride bag with integral 0.25 mm thick polyvinyl chloride gloves.

.2 Bag equipped with reversible double-pull, double-throw zipper on top to facilitate installation on pipe and progressive movement along pipe, with straps for sealing ends of bag around pipe, and with plastic flap under zipper for strength on pipe and to provide effective seal and with “ziploc” feature. Bags shall be secured using manufacturer’s prescribed securing devices. Approval must be obtained from the Inspector for use of Glovebags. Bag must be acceptable to the Inspector for use.

.3 Bag must have valves to allow insertion of a vacuum hose and the nozzle of a water sprayer while maintaining the seal to the pipe, duct or similar structure.

.6 *Negative Pressure Units:*

.1 Exhaust units fitted with High Efficiency Particulate Aerosol (HEPA) filters used to effect a negative pressure differential in the work area as compared to the immediate surrounding or clean area. The filtering system must be capable of collecting and retaining asbestos fibres to an efficiency of 99.97% for fibres of

0.3 um or larger. The HEPA filters must have been individually tested and certified by the manufacturer and bear a label certifying performance. The unit is to be fitted with instrumentation to indicate pressure differential across the HEPA filter with an audible alarm to sound at a preset low differential pressure.

.2 Construction of HEPA filter/fan cabinet units shall be airtight and all joints shall be caulked. The gasket seal between the filter housing and the retaining frame inside the cabinet shall provide a zero-leakage seal to avoid filter bypassing.

.3 **Each negative pressure unit shall be integrity tested at the work site prior to commencement of asbestos removal.** The procedure must include the testing of the integrity of the entire cabinet. Written confirmation of the test results are to be provided to the Inspector. Retesting may be requested by the Inspector and performed by the Contractor should the unit be damaged or modified during the work.

.7 *Differential Pressure Recorder:*

.1 Instrument to monitor and record the differential pressure between the Work Area and Clean Area.

.1	sensitivity:	0.025 mm (0.001 inches) WC increments between +0.25 mm to -2.5 mm (+0.010 to -0.100 inches) WC
.2	accuracy:	+/- 1 %
.3	pressure alarms:	audible high and low level alarm programmable within operating range
.4	printout:	minimum 24 hr period at 15 minute intervals

.8 *Ground Fault Panel:*

.1 Electrical Panel equipped with ground fault circuit breakers of sufficient capacity to power all electrical equipment and lights in work area. All breakers shall have 5 mA ground fault protection. Panel should be complete with all necessary accessories including ground fault interrupter lights, test switch to ensure unit is working, and reset switch. Ground fault receptacles on extension cords shall not be used without written authorization by the Arcadis Professional Services (Canada) Inc. Consultant.

.2 The GFI Panel must be constructed under the direction of a licensed Electrician and inspected by a licensed Electrician on a regular basis. Evidence of such construction and inspection shall be submitted to the Arcadis Professional Services (Canada) Inc. Consultant prior to installation of the Panel on site.

3.0 PART 3 – EXECUTION

3.1 MAJOR ASBESTOS WORK (TYPE 3 OPERATIONS)

Not Applicable.

3.2 ASBESTOS REMOVAL (GLOVEBAG METHOD)

.1 Before performing work:

.1 Prepare site by placing new 0.15 mm (6 mil) polyethylene plastic drop sheets on all surfaces immediately below and within 3.0 m of the work area.

.2 Remove all obstructions from around pipes to allow access for repair work.

.3 Inspect all glovebags for defects before using. A defective bag shall not be used.

.4 Ensure that any knife to be used inside the glovebag has a retractable blade and that any saw used inside the glovebag is of the flexible wire type; and brush used inside a glovebag shall not have metal bristles.

.2 Perform removal operations using the following procedures (in accordance to the manufacturer's instructions):

.1 Place any tools necessary to remove insulation in bottom of the containment bag.

.2 Install the bag on the pipe or fitting using shoulder straps and zipper provided. **Duct tape is not to be substituted for shoulder straps.** Support bag as necessary to avoid damage to the piping system or the bag itself.

.3 Insert nozzle of spray pump prefilled and primed with water and surfactant mixture (amended water) into the bag through the valve provided. Place hands in gloves and relocate the tools to the tool pouch.

.4 Cut or remove exterior insulation jacket, where applicable, to expose asbestos pipe covering. Wet exposed pipe covering with sufficient amended water to suppress any dust. Remove insulation and arrange in bottom of bag to obtain maximum capacity for the bag. Wash down exposed portion of pipe and top section of bag ensuring that insulation in lower portion of bag as well as any exposed end of insulation is thoroughly saturated. Use one hand and a cloth or sponge to aid in washing process.

.5 Ensure that pipe and other surfaces are clean of visual residue, dirt or dust prior to removal of the containment bag and seal all surfaces with encapsulant. Seal exposed ends of remaining asbestos insulation with encapsulant.

.6 If the glovebag is ripped, cut or opened in any way, work that may disturb friable material shall cease immediately. If the rip, cut or opening is small and easy to repair then the glovebag shall be repaired immediately with tape. Work may continue once the repairs are complete. If the rip, cut or opening is not small and cannot be easily repaired, place the glovebag immediately within a suitable asbestos waste container. Any spilled material containing asbestos shall be cleaned up and removed by using a vacuum equipped with a HEPA filter.

.7 To remove bag after completion of stripping, wash top section and tools thoroughly. Put all tools in one hand (glove), pull hand out inverted, twist to create a separate pouch, double tape to seal ends, cut and place in the next glovebag or into a water bucket, open pouch under water and clean and then allow to dry. Tools may also be cleaned and handed out during the dismantling of the bag while taking all precautions to prevent release of asbestos.

.8 Remove all air inside the glovebag by means of a vacuum equipped with a HEPA filter. Seal lower portion of bag and place bag into appropriate waste container.

.9 After removal of bag, ensure pipe is clean of all residue. If necessary after removal of each section of asbestos, vacuum all surfaces of pipe, using HEPA Filtered Vacuum equipment.

.10 Welds and folds of glovebags are to remain intact without modification to manufacturer's design.

.11 Glovebags, disposal bags, cloth rags and any porous materials are to be handled and disposed as hazardous waste.

.12 Frequently, and at regular intervals during the work and immediately upon completion of the work, glovebags containing asbestos-contaminated dust and waste shall be placed in a suitable waste container and shall be removed from the workplace.

.13 Immediately after removal of asbestos, clean all surfaces and equipment within the work area using a HEPA vacuum and damp wiping.

.14 Remove polyethylene floor covering, fold inward, and place in 6-mil polyethylene waste bags. Seal bags tightly.

.15 Place sponges, brushes, etc., in double polyethylene bags and seal tightly.

.16 Make arrangements for disposal of all asbestos-containing waste material.

3.3 TYPE 2 ENCLOSURE METHOD

.1 Preparation

.1 Separate the work area from the rest of the building using rope barriers, signage and other appropriate means. The extent of the work area will depend on the amount of work to be done, potential for fibre release and the height of the work above floor level.

.2 Identify the work area with clearly visible warning signs.

.3 Construct a frame for the enclosure from 50 mm x 100 mm (2” x 4”) studs or other suitable material (scaffolding, for example); if the potential exists for the disturbance of asbestos-containing material during the construction of the enclosure, wear a respirator and suitable protective clothing; ensure that the enclosure is of adequate size to permit the storage of equipment and waste.

.4 If the room where the work is to take place is small, the room itself may serve as an enclosure, provided that all openings are sealed, the mechanical ventilation system servicing the room is disabled and the ventilation ducts to and from the work area are sealed.

.5 Shut off the source of heat for piping systems (i.e., boiler or steam line header), where possible.

.6 Cover the walls, floor and ceiling of the enclosure with clear 0.15 mm polyethylene sheeting sealed with duct tape. Curtains of polyethylene sheeting must be fitted on each side of the entrance to the enclosure (curtain flaps may require weights at the bottoms to ensure proper closing).

.7 Disable the ventilation system servicing the enclosure; seal ventilation ducts to and from the work area.

.8 Shut off and lock out electrical power within the enclosure.

.9 Wear an appropriate respirator approved for use with asbestos and suitable protective equipment. Only persons wearing protective clothing and equipment shall be allowed to enter the work area. If the type of asbestos is other than chrysotile, a powered air purifying respirator shall be used.

.10 Do not use compressed air.

.11 Do not eat, drink, smoke or chew in the work area.

.12 Vacuum surfaces of insulated material in the work area using a HEPA vacuum.

.2 Asbestos Removal and Cleanup

.1 Only non-powered hand-tools, or power tools **FITTED WITH A DUST COLLECTION DEVICE AND HEPA FILTER** are permitted to be used.

.2 Do not eat, drink, chew or smoke within the work area.

.3 *Thermal insulation and cementitious parging material:* (piping and equipment) Ensure that heat sources to all piping systems, tanks, etc., have been shut off before work commences. Carefully cut open the outer cover of thermal insulation while spraying a mist of amended water on the section being worked on; thoroughly soak the underlying asbestos-containing material with amended water, using airless spray equipment. Spray the asbestos material repeatedly during the work process to maintain saturation and to minimize asbestos fibre dispersion.

.4 Remove the saturated asbestos material in small sections. Do not allow saturated asbestos to dry out. As it is being removed, pack the material into a waste receptor (polyethylene bag).

.1 Spray the asbestos material repeatedly during the work process to maintain saturation and to minimize asbestos fibre dispersion.

.2 Mist the air periodically with water.

.3 Excess water is to be treated as asbestos waste and is to be placed into a waste receptor (polyethylene bag). Refer to Waste Handling for cleaning and removal of bagged asbestos waste.

.5 After completion of asbestos removal, all surfaces from which asbestos has been removed shall be brushed and wet-sponged to remove all visible material and residues. During this Work the surfaces shall be kept wet.

.6 Clean all surfaces and equipment within the work area, including polyethylene sheeting, using a HEPA vacuum or by damp wiping.

.7 Seal all surfaces of pipe or other equipment, enclosure, and ends of exposed insulation with a suitable encapsulant.

.8 After satisfactory completion of cleaning and before leaving the work area, decontaminate protective clothing (including boots) and equipment, etc., using a HEPA vacuum or by damp wiping.

.9 Dismantle the enclosure and wet and dispose of all polyethylene sheeting, brushes and sponges as asbestos waste.

.10 Dispose of protective clothing as asbestos waste.

.11 Wash hands and face at the completion of the work (before leaving the work area); damp wipe the respirator and store in a proper place.

.12 Make arrangements for disposal of all asbestos-containing waste material.

3.4 TYPE 2 NON-ENCLOSURE METHOD

Not Applicable.

3.5 TYPE 1 OPERATION

Not Applicable.

3.6 WASTE DISPOSAL

.1 Asbestos-containing wastes shall be disposed of in accordance with procedures established by the Ontario Ministry of the Environment *Regulation 347 (as amended) under the Environmental Protection Act* and the Government of Canada *Transportation of Dangerous Goods Regulations*.

.2 All waste is to be removed from the site and disposed. Disposal containers are not to be left on the property unattended unless fully enclosed and locked. Bins must be removed immediately on completion of work.

.3 Both sides of every vehicle used for the transportation of asbestos and every waste container must display in large easily legible letters that contrast in colour with the background the word “CAUTION” in letters not less than 10 cm in height and the words:

CONTAINS ASBESTOS FIBRES
Avoid Creating Dust and Spillage
Asbestos May Be Harmful To Your Health
Wear Approved Protective Equipment

.4 Both sides of every waste container must display in large easily legible letters the words **‘ASBESTOS, WHITE, PRODUCT IDENTIFICATION NUMBER 2590’** or **‘ASBESTOS, BLUE, PRODUCT IDENTIFICATION NUMBER 2212’** in accordance with the type of asbestos being transported.

.5 Every vehicle used for the transportation of asbestos waste shall display a Class 9 placard on the front, back and two sides of the vehicle.

.6 The waste must be transported in a fully-enclosed truck, or alternatively, in a waste disposal skip. The driver must be familiar with cleanup and handling procedures and be trained to deal with spills or container breakage.

.7 The truck must be equipped with a shovel and broom, wetting agent, protective clothing, respiratory protective equipment, polyethylene bags of at least 0.15 mm (6 mil) thickness, and bag closures and duct tape.

.8 All waste must be transported with a **Bill of Lading** directly from the work area to the waste disposal site. The Bill of Lading is to indicate the source and type of asbestos, the Carrier, the amount, the destination (disposal site) and date all in accordance to applicable regulations. A copy of the Bill of Lading and disposal site receipt is to be provided to the Inspector.

3.7 AIR MONITORING

.1 Air tests will be taken at the discretion of the Asbestos Consultant using the Phase Contrast Microscopy (PCM) method from the time asbestos-containing materials may be disturbed until the final visual inspection of the work area(s). PCM will be used for final clearance air monitoring analysis.

.1 *Outside Asbestos Removal Work Areas:*

.1 The maximum allowable fibre concentration outside the Work Areas during asbestos removal or cleanup shall be 0.05 f/cc. Should readings exceed this value, the work shall stop at the discretion of the inspector and proceed only after the cause of the high fibre counts has been remedied.

.2 All costs associated with the cleaning, monitoring, and disruption caused by excessive fibre levels outside the Work Area and related to the work, are to be borne by the Asbestos Contractor including but not limited to:

.1 thorough cleaning with wet wiping and HEPA vacuuming by the Asbestos Contractor to the extent and satisfaction of the Inspector,

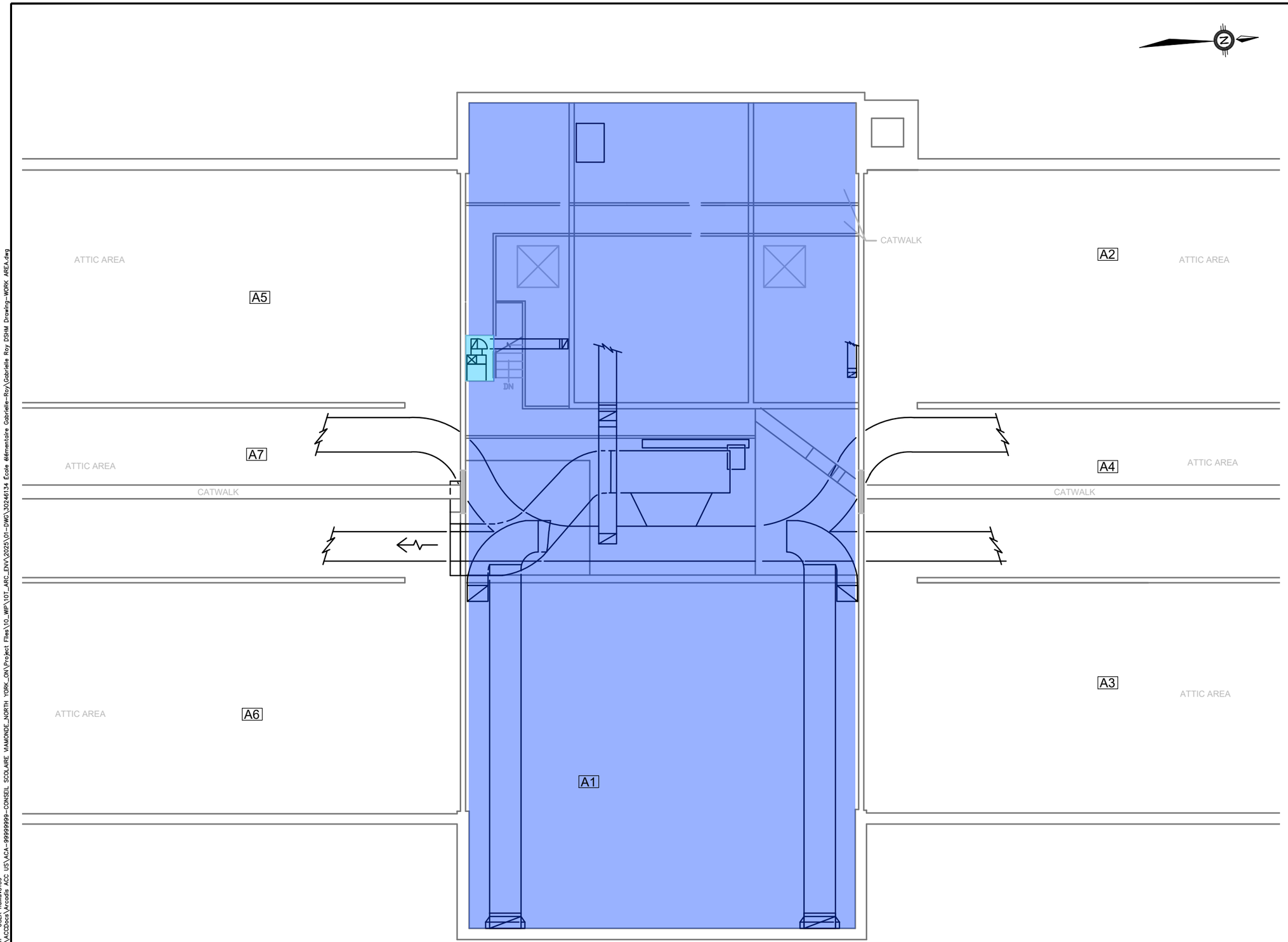
.2 all activities deemed necessary by the Inspector including area isolation, personnel relocation, additional visual inspections and air monitoring to confirm that the area has been adequately cleaned,

.3 disruption of plant production, office routine, and delays.

.2 *Final Clearance Test:*

Not Applicable.

END OF SECTION



LEGEND:

A2 FUNCTIONAL SPACE

WORK AREA 1

WORK AREA 2

NOTE:

REVISIONS:

No.	Date:	By:	Revisions

REFERENCE:

1.

ARCADIS

CONSEIL SCOLAIRE VIAMONDE

ASBESTOS ABATEMENT SPECIFICATIONS

LOCATIONS OF WORK AREAS

ÉCOLE ÉLÉMENTAIRE GABRIELLE ROY
14 PEMBROKE STREET, TORONTO

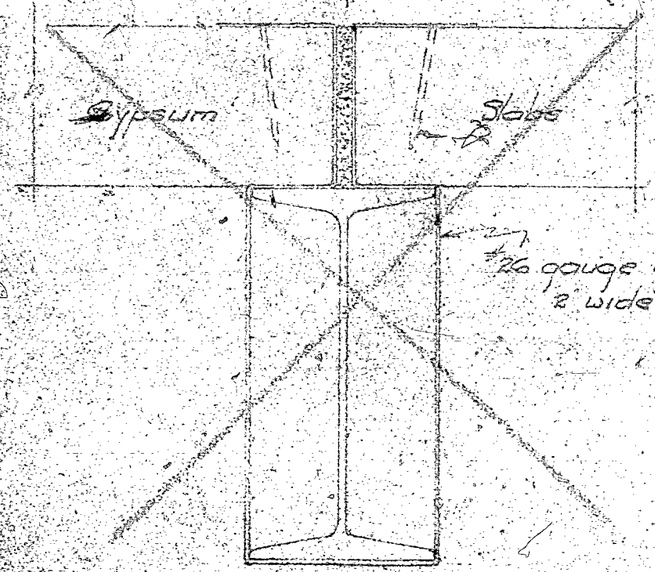
ATTIC FLOOR PLAN

Drawn By: G.E.C.	Approved By: J.D	Project No: 30246134
Date: FEB 2025	Scale: N.T.S	Drawing No: 30246134-1

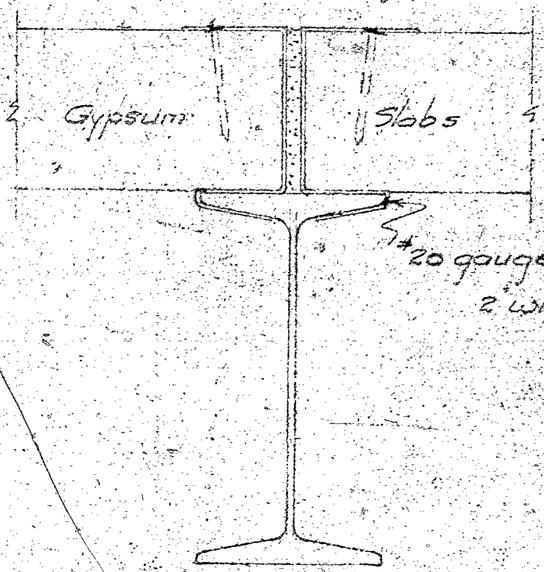
Appendix C

Existing Reference Drawings

Method of Anchoring Precast Gypsum Slabs to Roof Purlins

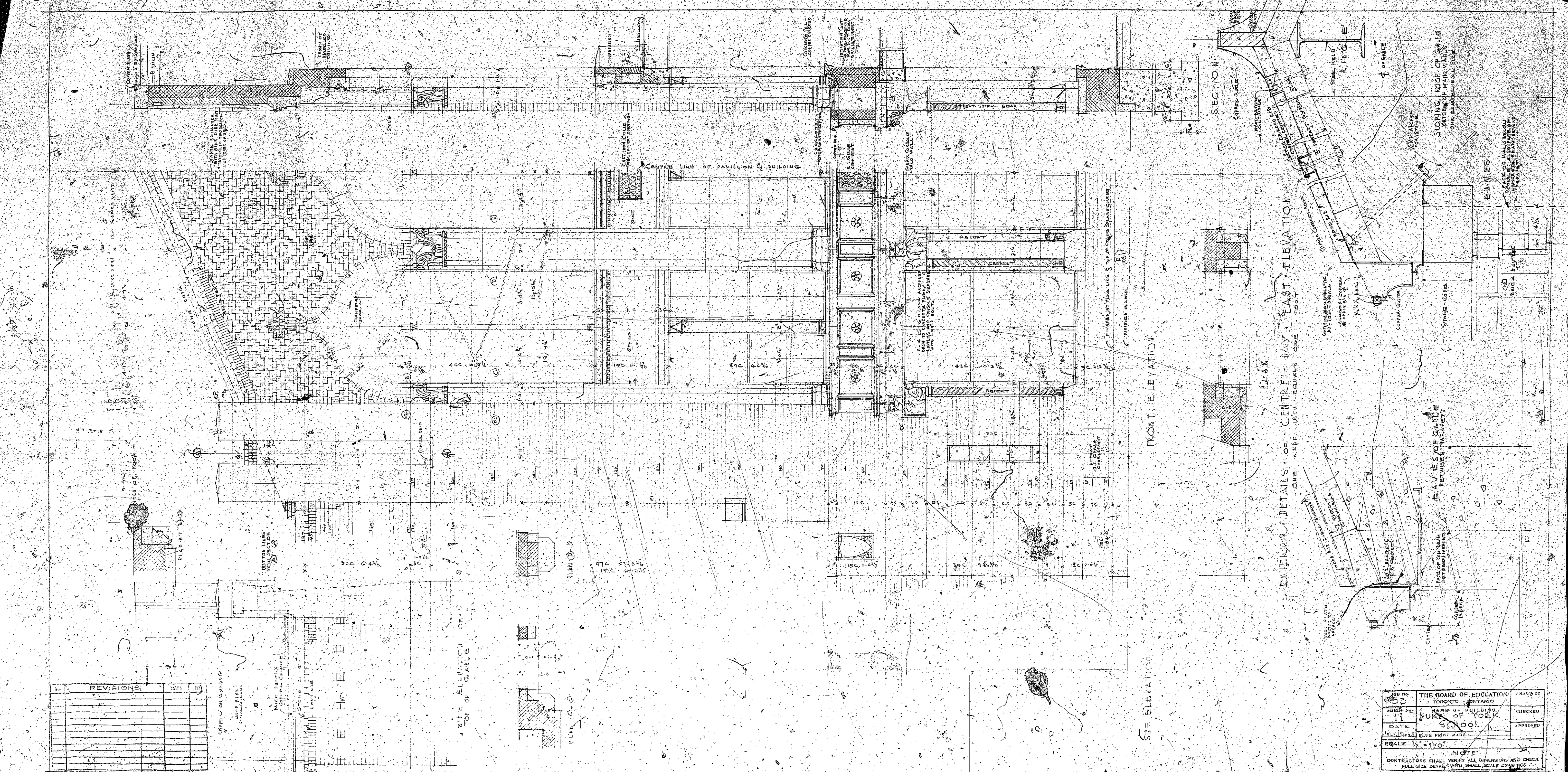


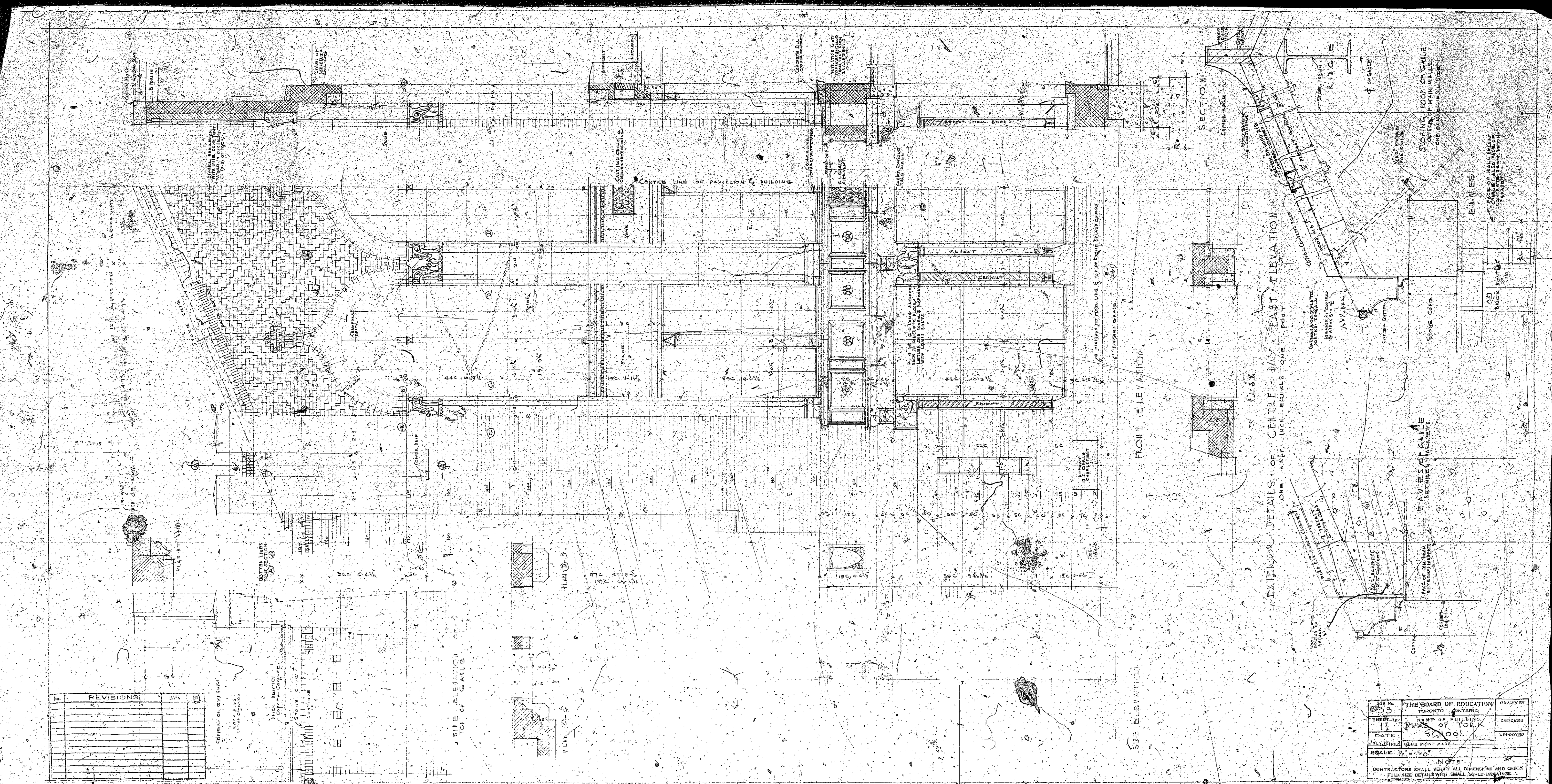
Where Steel is Not Exposed



Where Steel is Exposed

Ochelle Gypsum Co.


SECTION
FRONT ELEVATION
PLAN
EXTERIOR DETAILS OF CENTRE BAY EAST ELEVATION
ONE HALF INCH EQUALS ONE FOOT
SIDE ELEVATION
CENTRE LINE OF PAVILLION & BUILDING
REVISIONS
JOB No. 33
THE BOARD OF EDUCATION
TORONTO ONTARIO
DRAWN BY
SHEET No. 11
NAME OF BUILDING
DUKE OF YORK SCHOOL
CHECKED
DATE JULY 12 1929
BLUE PRINT MADE
APPROVED
SCALE ½" = 1'-0"
NOTE
CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CHECK FULL SIZE DETAILS WITH SMALL SCALE DRAWINGS.



FRONT ELEVATION
SECTION
PLAN
SIDE ELEVATION
EXTERIOR DETAILS OF CENTRE BAY EAST ELEVATION
ONE HALF INCH EQUALS ONE FOOT
REVISIONS
JOB No. 33
THE BOARD OF EDUCATION
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DATE
JULY 12 1929
BLUE PRINT MADE
APPROVED
SCALE ½" = 1'-0"
NOTE
CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CHECK FULL SIZE DETAILS WITH SMALL SCALE DRAWINGS

REVISIONS		
No.	DATE	BY

PLAN THRO EAST GYMNASIUM WALL

SECTION THRO LARGE GYMNASIUM WINDOWS

DOMESTIC ART & MANUAL TRAINING WING
ONE HALF INCH EQUALS ONE FOOT

END TOWERS
ONE HALF INCH EQUAL ONE FOOT

EXTERIOR ANGLE ELEVATION OF END STAIRCASE TOWERS

SECTION OF EAVES END TOWERS
ONE QUARTER FULL SIZE

ENTRANCE DOORS
NOS 105 AND 106
ONE HALF INCH EQUALS ONE FOOT

EXTERIOR DETAILS OF GYMNASIUM WING
ASSEMBLY HALL SIMILAR
SCALE ONE HALF INCH EQUALS ONE FOOT

JOB No.	33
SHEET No.	12
DATE	JUNE 12 1913
SCALE	1/8 = 1'-0"
THE BOARD OF EDUCATION	TORONTO ONTARIO
NAME OF BUILDING	DUKE OF YORK SCHOOL
BLUE PRINT MADE	
DRAWN BY	
CHECKED	
APPROVED	

NOTE
CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CHECK FULL SIZE DETAILS WITH SMALL SCALE DRAWINGS