SPECIFICATIONS FOR

Proposed Benchmark

Renovations for

Viscount Montgomery

School

Hamilton-Wentworth

District School Board

March 2023

List of Drawings

Architectural produced by Richard G. Butterworth Architect Inc.

Electrical produced by Shellard Building Systems Ltd.

Mechanical produced Shellard Building Systems Ltd.

1. **GENERAL REQUIREMENTS**

The rules and information that follow are for the protection of all persons using the Board of Education property. The Contractor must follow the directions. Failure to conduct work in a safe and healthy manner may result in removal of employees from Board property and/or termination of contract. The rules contained here will not cover all repair/renovation/construction work situations. The Contractor, however, must understand that the Board's intention is to carry out all work in a safe and healthy manner. Every Contractor and sub-contractor employed on site shall read all the instructions herein. Reference to the 'Board' or 'Client/Owner' herein means the Hamilton Wentworth District School Board.

2. **REPORT TO OFFICE**

All Contractors entering schools MUST REPORT TO THE SCHOOL OFFICE AND SIGN IN Describe what you plan to do and how long it will take and sign out before they leave.

3. **WORK SITE LOCATION**

It is the responsibility of the contractors to provide appropriate and adequate rope, barricades, fencing, hoarding, warning signs, warning lights to clearly demark the site boarders and areas not to be used by usual occupants of the building or grounds. Without limiting the generality of the foregoing, the Contractor shall at all times erect and maintain adequate fencing around all excavations, pits, and in other places of danger. Sufficient barricades must be in place to prevent persons from potentially placing themselves in danger.

4. **OPERATION OF VEHICLES ON BOARD PROPERTY**

Trucks, etc., shall proceed with caution at 10 KPM maximum on school property. When children are playing, coming or going from school, trucks, etc., will be stopped and remain stopped until all children enter the school or leave school grounds. All trucks must be equipped with an automatic warning beep or horn sound when backing up. If there are two people in the truck, one should get out and walk behind the truck while it is backing up, and act as a signaler.

The Contractor must provide a list of his mobile equipment requirements on site. Before entering Board property, the Owner/Client must have this list and the appropriate arrangements made for access onto Board grounds.

Construction vehicles used on Board property must not be loaded beyond their licensed capacity, and passengers must ride within the cab, except when backing up. Riding upon running boards, fenders, hoods, scraper blades, and buckets, or in boxes or other attachments is prohibited. Employees must not board nor jump off moving vehicles.

Signs shall be posted in prominent locations and in sufficient numbers to warn workers of a hazard on a project.

Construction vehicles must be left in designated areas and, when not in use, must not obstruct emergency vehicles or public ways.

Access to the construction site will be established by the Owner/Client prior to the start of construction.

5. **DISCOVERY OF UNKNOWN SUBSTANCE**

The hazardous substances locations listed in the current Designated Substances Report provided by the Owner may not be complete. If an unknown substance is discovered during a renovation/repair that may be asbestos, then notify the Owner immediately, and the material must not be disturbed until a sample is analyzed. Contact the Environmental Consultant for further action. Copy the Prime Consultant and Owner/Client.

6. **HAZARDOUS MATERIALS**

Work described within the Hazardous Materials specifications is required to be performed by a qualified Abatement Contractor on the HWDSB's prequalification list.

7. **ASBESTOS**

The Contractors are responsible to provide asbestos awareness training to their employees. All schools have lists of asbestos and its location in the school. It is available through the school office and should be checked before starting new work. If the job is a large renovation, the Contractor will have been provided with a more detailed pre-renovation asbestos survey. This also should be read before commencing new work.

8. **SILICA**

Silica: the general contractor and sub-trades are required to ensure all work is performed in accordance with the Silica on Construction Projects guideline, as published on the Province of Ontario's website.
https://www.ontario.ca/document/silica-construction-projects#

9. **LEAD**

Lead: the general contractor and sub-trades are required to ensure all work is performed in accordance with the Lead on Construction Projects guideline, as published on the Ministry of Labour, Immigration, Training and Skills Development website.
https://www.labour.gov.on.ca/english/hs/pubs/lead/

10. **MERCURY**

Mercury: the general contractor and sub-trades are required to ensure all work performed to remove and dispose of mercury-containing fluorescent lights and mercury-containing items (e.g. thermostats) is completed by workers who have been trained by a competent and qualified person.

11. **PCB**

PCBs: the general contractor and sub-trades are required to ensure all work performed to remove and dispose of PCB-containing ballasts is completed in strict accordance with federal regulations. Removal and handling of PCBs is to be performed by workers who have been trained by a competent and qualified person.

12. **TOOLS AND EQUIPMENT**

All vehicles, machinery, tools and equipment shall be inspected regularly and shall be maintained in a condition that does not endanger a worker. Equipment includes all guards and other safety devices. Gasoline engines are to be shut down and cold before refueling.

13. **PROPANE TANKS**

Propane tanks shall not be stored in school buildings overnight.

A qualified person with an Ontario Propane License will be the only one allowed to work on propane installations or to supervise the moving of these installations.

No storage area for propane at any time should be placed closer than three (3) meters to a source of ignition or fire, except as allowed under the regulations.

When cylinders are not in use, they must be protected from falling materials.

Cylinders must always be transported by some material handling device (not carried manually). When being transported in vehicles, the movement of cylinders should be prevented and the cylinders must have their gauges removed, and caps installed. Cylinders must never be hoisted with a rope or chain sling.

14. **OXYGEN AND ACETYLENE CYLINDERS**

Oxygen and acetylene cylinders must be chained in the vertical position or be strapped on a welding cart designed for the purpose. When not on a cart, the cylinder pressure gauge must be removed and the cylinder cap on. Full and empty tanks are to be stored in separate signed areas.

Cylinders must always be transported by some material handling device (not carried manually). When being transported in vehicles, the movement of cylinders should be prevented and the cylinders must have their gauges removed, and caps installed. Cylinders must never be hoisted with a rope or chain sling.

15. **FLAMMABLE LIQUIDS**

All oakum, rags, or other materials impregnated with paint thinners, etc., must be stored in an approved, labeled container and/or area.

Approved safety containers must be used for the storage and transportation of flammable materials. All containers must be appropriately labeled according to WHMIS Legislation.

Where flammable materials are being transported or transferred, they must be properly secured and ventilated.

16. **CONTROLLED PRODUCTS**

All controlled products must have WHMIS labels on the container brought to the school. One day's supply may be used without a label if used by one employee exclusively. Contractors must be able to show that they have attended a WHMIS training course.

Contractors must comply with all aspects of the Workplace Hazardous Materials Information System (Ontario Regulation 644/88).

Contractors must have all controlled products labeled according to WHMIS Legislations when the materials are brought onto Board property. Contractors must provide Workplace Labels for controlled products which do not have supplier labels on the containers.

A workplace label is not required where a material is decanted and the decanted material is used exclusively by the employee who decanted it, and that material is going to be used up during the shift in which it is filled.

Contractors must have copies of Material Safety Data Sheets (MSDSs) for all controlled products they bring onto Board property readily available at the worksite. The Contractor must ensure that the information on the MSDS is up to date (MSDSs are valid for three (3) years from the date of production).

Any Board employee or any Contractor working for the Board may request, through the Plant Department Representative, a copy of any or all MSDSs for controlled products used by the Contractor, if the controlled products are used or contained in an area where Board employees or other contractors may enter.

Contractors who use controlled products must ensure that their workers are properly trained in the safe use and handling of such products. Contractor's employees must be trained through the Construction Safety Association program for construction workers. In addition, contractors should review with their employees: fire hazard information, health hazard information, controls which should be in place, and protective equipment that should be used.

17. **NATURAL GAS PIPING**

Only persons with a gas-fitter's license are to tighten or loosen, install or remove a natural gas fitting, device, or pipe.

18. **SAFETY EQUIPMENT**

The Contractors are responsible for and obligated to have all employees wear such protective clothing and use such personal protective equipment and devices as are necessary to protect the worker against

the hazards to which the worker may be exposed. Workers required to wear protective clothing or use personal protective equipment or devices shall be adequately instructed and trained by the contractor in the care and use of the clothing, equipment or devices before wearing or using them. Safety equipment shall include but not be limited to, safety boots, hard hats, safety

glasses, goggles, gloves, respirators, hearing protection devices, safety belts, safety harness, and lifelines.

19. **FIRE EXTINGUISHERS**

The Contractors are responsible for providing fire extinguishers in the repair/renovations/construction areas at readily accessible and adequately marked locations. Contractors shall ensure that employees are able to use the extinguishers in a safe and proper manner. Fire extinguishers must be protected from physical damage or from freezing. After a fire extinguisher is used, it shall be refilled or replaced immediately. Every fire extinguisher shall be inspected for defects or deterioration, at least once a month by a competent worker who shall

record the date of the inspection on a tag attached to it. Fire extinguishing equipment shall be of a suitable type and size to permit the evacuation of workers during a fire.

20. **SMOKING/VAPING**

Smoking and Vaping on school property is not permitted.

21. **ALCOHOL & DRUGS**

Consuming alcohol or drugs on Board property work sites is prohibited. Persons appearing to use alcohol or drugs may be removed from the site.

22. **HOUSEKEEPING**

If a form work tie, reinforcing steel, a nail or another object protruding from concrete or another surface may endanger a worker, the protrusion shall be removed or cut off at the surface or otherwise protected as soon as practicable. Materials must be laid down and piled, stored or moved in a manner that does not endanger a worker. Pieces of pipe, welding rod, and small round objects must be placed in refuse containers and not left on the floor.

23. **HYGIENE**

A reasonable supply of portable drinking water should be kept readily accessible at a project for the use of workers in accordance with the Regulations. The Contractor shall provide or arrange for the use of portable toilet and clean up facilities before work is started on a project. Such facilities to be reasonable accessible. Workers who use corrosive, poisonous or other substances likely to endanger their health shall be provided by the contractor with washing facilities with clean water, soap and individual towels.

24. **ELECTRICAL WIRING**

Only journeymen electricians are to work on building electrical wiring, switches, etc., including temporary power tie-ins.

25. **LADDERS, SCAFFOLDS, SWING STAGES, VERTICAL MAN-LIFTS**

The Contractors are responsible for training their employees in inspecting, erecting, dismantling, and using scaffolds, ladders, swing stages, and vertical man-lifts. The following items shall be covered but not limited to visual inspection for broken, bent, loose, or missing pieces. The ladder must extend 3 feet beyond the upper support. Over 10 feet or higher, the ladder must be held by a worker on the ground or tied at the top. The top step or pail shelf of a stepladder must not be used as a step. Formal training must be given on scaffolds, swing stages, and vertical man-lifts if used on job. Construction Association offers courses. A scaffold shall be designed by a professional engineer where required by the Regulations and every scaffold, suspended platform, suspended scaffold, elevating work platform or boatswain's chair shall meet the requirements of the Regulations of the OHSA.

When no figures are given, the drawings shall be followed to scale, but figures shall govern in all cases of difference. Larger scale drawings shall govern all smaller scale drawings.

The drawings and this specification shall be considered co-operative. All work necessary to the completion of the contract, whether shown on the plans and not described herein, or vice-versa, shall be considered a part of this contract and must be properly executed.

The Contractor will understand that the work herein described and shown on drawings shall be complete in every detail, notwithstanding every item necessarily involved is not particularly

mentioned, and the Contractor will be held to provide all labour and materials necessary for the entire completion of the work intended to be described, and shall not avail himself of any manifestly unintentional error or omission, should such exist.

26. **LOCATION OF APPARATUS**

The location of apparatus, fixtures, outlets, etc., shown or specified shall be considered as only approximate. The actual location shall be as directed and as required to suit the conditions at the time of installation. Before installation of the apparatus, the Contractor shall consult the Board and ascertain the actual location required.

27. **MEASUREMENTS, ETC.**

Before ordering any material or doing any work, such Contractor shall verify all measurements at the building or as may be required for the proper fitting of his work and to make adjustable parts fit

to fixed parts. He shall be responsible for the correctness of his figures, and properly correct without charge any work which does not fit, and furnish new work if necessary.

No extra charge will be allowed on account of the differences between the actual dimensions and the measurements indicated on the drawings. Any difference which may be found shall be submitted to the Board for consideration before proceeding with the work.

28. **CUTTING, PATCHING AND DIGGING**

The Contractor shall do all cutting, fitting or patching of his work that may be required to make its several parts come together properly and fit to it receive or be received by work of other Contractors,

shown upon or reasonably implied by the contract documents, and he shall make good after them as the Board may direct.

All cutting of the various trades shall be done only by skilled mechanics and competent men of such trades, and all such cutting shall be made good by competent workmen of each trade only.

Any cost caused by ill-timed work shall be borne by the party responsible therefor.

The Contractor shall not endanger any existing work by cutting, digging or otherwise, and shall not cut or alter the work of another Contractor save with the consent of the Board.

29. **FURRING IN PIPES AND DUCTS**

The General Contractor shall be responsible for an acceptable job of furring in all pipes and ducts where shown on the plans or reasonably expected in finished rooms. Furring in shall be carried out in the material of the walls, adjacent to the pipes, such as metal stud, wood, masonry, etc.

30. **BROKEN GLASS**

The Contractor shall be held responsible for all damaged, broken or scratched glass in areas affected by his work, and at completion shall replace at his own expense all such glass.

31. **OWNER'S EQUIPMENT**

All equipment, fixtures, doors, hardware and all other items removed in the course of renovations, and not required for completion of the contract, shall be handed in to the Board. A list of these

items (in duplicate) shall be prepared and signed by the Contractors' and the Plant Department representatives.

32. **CLEANING UP**

In addition to the housekeeping requirements as set out under paragraph 16., if the work consists of renovation work in an existing school or Board building, the building must be cleaned of all such materials at the close of each day's work. Each sub-contractor shall clean his own work.

Upon completion of the work, all debris, surplus materials, tools and equipment shall be cleaned up and removed from the building and the site and the building left broom clean and the site in a neat and tidy condition to the satisfaction of the Board. The Contractor shall clean all floors, glass, painted and stained woodwork, all hardware, fixtures, and equipment.

33. **GUARANTEES**

General

All work is to be guaranteed for a period of one (1) years after 100 percent completion of the work, during which time any imperfections which may develop in the workmanship or materials used or any work affected in making good such imperfections must be made good promptly by the Contractor without cost to the Board.

A warranty inspection is to be made just prior to the termination of the guarantee period to list all outstanding imperfections to be corrected by the contractor at no cost to the Board.

34. **ACCEPTANCE**

By reason of having submitted a tender on the work described herein, the general contractor does hereby acknowledge that they have read the specifications and do hereby accept these conditions and specifications as the instructions governing the work.

35. **UNIONS**

It is wholly the Contractor’s and his Subcontractors responsibility to follow all Trade Union requirements for which they are signed. If conflicts, disputes, pickets or any other disturbances or lost time occurs, the Contractor must take the necessary steps expediently to resolve the matter. The Board and the Consultant will not be held liable for any cost of injunctions or lost time.

36. **MAINTANENCE MATERIALS**

Provide all maintenance materials to the School as outlined in each specification sections.

-End-

1.1 INTENT

.1 This section outlines the general conditions that shall be administered by the General Contractor. While the specification section establishes the requirements for each trade, the General (or Principal) Contractor shall directly supervise and administer all contract requirements to ensure the provision of materials, labour and equipment necessary to complete the work on time and to the quality specified. Reference to GC refers to General Conditions for Public and Invitational Tenders as amended by Supplementary General Conditions.

2.1 SCOPE OF WORK

.1 The general scope of work shall include, but not be limited to, the supply of labour, equipment, materials, and transportation to execute work in accordance with the drawings and specifications.

3.1 QUALIFICATION OF CONTRACTOR

.1 All work shall be done by a recognized established qualified and competent contractor. This contractor shall employ only skilled mechanics or installers who have been thoroughly trained or competent in carrying out the work specified in the contract.

.2 Where required by a manufacturer of specialty products, only contractors that are approved as applicators shall be utilized.

4.1 CONSTRUCTION SCHEDULE AND ON-SITE PROJECT DOCUMENTS

.1 Within receipt of the authorization letter to proceed by Owner, prepare and submit a detailed Construction Schedule, clearly showing the anticipated progress stages, start and finish date of each construction phase and date of final completion with-in 10 working days showing dates for the following:

a) Submission of material sample submittals (along with an itemized list of samples to be submitted)

b) Submission of shop drawings (along with an itemized list of shop drawings to be submitted)

c) Supply and installation of:

i) All new ceilings
ii) All new flooring
iii) All other Architectural work shown on drawings or specified herein
iv) All HVAC Equipment
v) All New Lighting
vi) Mechanical items in Sections 15
vii) Electrical items in Sections 16

.2 On approval of the Construction Schedule by the Owner, proceed to ensure completion of work within the scheduled time. Carry out work in a continuous manner. If at any time one phase falls behind schedule, take necessary measures to expedite subsequent phases to maintain or improve on completion date.

.3 Maintain at the job site, one copy each of following:

a) Contract Drawings (architectural, engineering and all related consulting drawings)
b) Specifications
c) Addenda
d) Reviewed shop drawings
e) Change Orders, Contemplated Change Orders and Change Directives/Notices
f) Site/Field Instructions
g) Other modifications to contract
h) Field test reports
i) Copy of approved Construction Schedule
j) Manufacturers' installation and application instructions.
k) List of Sub-contractors
l) Progress photographs
m) Record Set of Drawings (being progressively updated)
n) Minutes of Meetings
o) Building Permit

5.1 SPECIFICATIONS

.1 Portions of Specifications are written in short form. Therefore, it shall be understood that where item of Work is stated in heading followed by material, equipment, component, or operation, words "shall be", "shall consist of" or similar words or phrases are implied which denote supply, fabricate and supply, install, provide or commission of such materials, equipment or operations for component of Work designated by heading.

.2 Whenever used in Specifications the following definitions shall apply:

a) SUPPLY - Procurement or fabrication of standard components not to special design of materials, equipment, or components, or performance of services to extent indicated. Where used with respect to materials, equipment, or components, term shall include delivery to
b) Site but is not intended to include installation of item, either temporary or final.
c) FABRICATE AND SUPPLY - Fabrication of materials, equipment or component, to special customized design to extent indicated including delivery to Site, assisting in form of supervision to those Section(s) installing materials, equipment or
d) component. Term does not include installation of item either temporary or final.
e) INSTALL - Placement of materials, equipment, or components, including receiving, unloading, transporting, storage, uncrating and installing, and performance of such testing and finish work as is compatible with degree of installation specified complete ready for use.
f) PROVIDE - To Supply and Install, compete and in place, including accessories, finishes, tests and services as required to render item so specified

complete ready for use.

g) COMMISSION - Startup and initial operation of equipment as required and/or as specified in respective Sections, to demonstrate satisfactory operation of components and entire system including calibration of any control instrumentation as required to maintain operations.

.3 Drawings, Lists or Schedules of Items are intended to show scope and arrangement of work. For location of item described refer to such Drawings,
Lists or Schedules unless location stipulated in Specifications.

.4 Wherever words "acceptable", "approved", "reviewed", "satisfactory", "selected", "directed", "designated", "permitted", "inspected", "instructed", "clarification", "required", "report", "submit", "obtain", "consult", "advise", or similar words or phrases are used in Standards or in Contract Documents, it shall be understood that, unless context provides otherwise words "by/to/with/from the Architect shall follow them as applicable.

.5 Related Work', 'Related Divisions', 'Related Sections' etc.: Specification sections provided herein may note and/or itemize specific sections or divisions of related work. This information is provided for general reference only. In all circumstances, the actual scope of related work is to be as shown/required by the scope of work outlined in all of the Contract Documents (including the drawings) and in no way is to be limited to any information, provided, not provided and/or referenced in the Specification documents.

6.1 **TEMPORARY SERVICES**

.1 Refer to Owner's General Conditions.

.2 If necessary the Contractor shall provide, at their expense, the following temporary services for construction purposes from existing terminals, only in locations designated by the Owner:

Power: 110 volt electrical, 230 volt electrical (at available current) for temporary lighting and operation of power tools. Owner will pay for electricity rates. The contractor can use the power at the school, however if additional power is required or temporary connections into existing panels are needed for specialized equipment, the contractor will do such work at their own expense.

.3 The Owner may discontinue such services at any time to serve emergency Owner's requirements and will accept no liability for any damage or delay resulting from such withdrawal of the service.

.4 **Telephone:** Provide and pay for temporary telephone service for use on site.

.5 The General (or Principal) Contractor is responsible for providing temporary services during the contract for all construction purposes.

7.1 TEMPORARY FACILITIES

.1 **Temporary Toilet Facilities:**

.1 General Contractor shall supply and maintain temporary toilet facilities on-site, **School Washroom Facilities are not to be used by Trades personal**.

.2 **Temporary Enclosures, Bracings, Scaffolding etc.:**

.1 Isolate work areas to protect other tenants and workers from injury, private and public property from damage, by providing guards, rails, hoardings, braces, shoring, underpinning, temporary covers, covered passageways, ramps, stairs, warning signs, visual, audible signals, and fire rated exit enclosures.

.2 Provide necessary protection without interfering with free, safe passage and maximum possible use of the premises by other tenants.

.3 Replace, repair or make good damage immediately.

.4 Ensure that no unauthorized personnel are allowed in the work areas.

.5 Erect all scaffolding independent of walls. Construct in a safe, secure and rigid manner. When not in use place in a position as not to hinder other trades or work. Remove promptly when work is complete.

.3 **Temporary Storage**:

.1 A construction storage area will be designated on site for the storage of construction materials. **Interior occupied areas shall not be used for construction storage.**

.2 Provide secure shipping style containers and/or suitable coverings for materials that are to remain dry.

.3 Deliver, store and maintain packaged materials and equipment with manufacturer's seals and labels intact.

.4 Prevent damage, adulteration, and soiling of material and equipment during delivery, handling and storage. Immediately remove rejected materials and equipment from site.

.5 Store and maintain material and equipment in accordance with manufacturer's and supplier's instructions.

.6 Do not load, or permit to be loaded, any part of the work with a weight or a force that will endanger the work.

.4 **Temporary Construction Office:**

.1 General Contractor shall supply and maintain temporary construction office on-site if they deem necessary, **School interior areas shall not be used for construction office**.

8.1 HEATING AND VENTILATION

.1 Pay for temporary heat and ventilation used during construction including cost of installation, fuel, operation, maintenance and removal of equipment. Use of direct-fired heaters discharging waste products into work areas will not be permitted unless prior approval is given by the Owner.

.2 Furnish and install temporary heat and ventilation in enclosed areas as required to:

.1 facilitate progress of work
.2 protect work and products against dampness and cold
.3 prevent moisture condensation on surfaces
.4 provide ambient temperature and humidity levels for storage, installation and curing of materials
.5 provide adequate ventilation to meet health regulations for safe working environment.

9.1 CONSIDERATION FOR OTHER OCCUPANTS

.1 Execute work to cause minimum interference to other occupants and their personal effects.

.2 Take reasonable measures to control noise during operations.

10.1 EXISTING SERVICES

.1 All work associated with existing services shall be done in accordance with applicable codes. Obtain and pay for any required permits or fees.

.2 Temporarily disconnect and remove existing services as may be necessary to gain access to the work. Upon completion, reinstall and re-connect services to original condition.

.3 Re-route any existing services which interfere with the work of this contract. Extend or modify any existing services as necessary to suit new conditions resulting from the work of this contract.

.4 Obtain the Owner's approval prior to making any modifications to the existing services.

.5 Before commencing work, establish location and extent of service lines in area of work and notify Owner of findings.

.6 Where unknown services are encountered, immediately advise Owner and confirm findings in writing.

11.1 **FIRE SAFETY REQUIREMENTS**

.1 Refer to General Conditions and in addition, comply with the Ontario Fire Code, by:

.1 Shutting off and capping abandoned service lines.

.2 Maintaining and protecting continuing service lines.

.3 Providing fire watches as required.

.4 Management of combustible salvage, waste and rubbish.

.5 Protecting persons and properties.

.6 Maintaining operable fire detection and protection equipment.

.7 Maintaining fire fighters' access.

.8 Providing temporary fire extinguishing equipment.

.9 Maintaining existing and temporary fire exits.

12.1 **CONTRACTOR'S USE OF SITE**

.1 Limited to areas for work and outside office and storage as directed by the Owner.

.2 Do not unreasonably encumber site with materials or equipment.

.3 Do not obstruct entrances, stairs or fire exits.

.4 Maintain free access route for fire, ambulance and garbage trucks.

.5 The placement of refuse bin will be allowed in an area agreed to with the Owner.

.6 Make good damage to paving, grass, walkways, curbs, trees, planting beds, etc. caused due to the work of this Contract.

.7 No On-Site Parking will be provided by the Owner. Off-Site parking on Municipal Streets must be reviewed and approved by the local Municipality.

.8 Existing millwork, cabinets, countertops, loose or fixed furniture, equipment or other similar permanent surfaces to remain or be relocated shall not be used for construction work surfaces or storage. The general Contractor and or Subcontractor shall provide their own temporary storage and work surfaces.

13.1 **CUTTING, FITTING. HOT WORK AND PATCHING**

.1 All cutting and patching by General Contractor.

.2 Inspect and locate existing conditions including elements subject to damage or movement.

.3 Obtain the Engineer's and Owner's approval before doing any hot work, cutting, boring or sleeving load bearing members.

.4 Where work connects with existing and where existing work is altered, cut, patch and make good to match existing.

14.1 LAYOUT OF WORK

.1 Be responsible for layout of all parts of the work in accordance with lines, levels, elevations and measurements shown on the drawings. Errors resulting from failure to verify figures or the proper layout of any element of the installation shall be rectified without additional cost.

15.1 STANDARDS

.1 The specification refers to national and international standards, such as CGA, CGSB, CSA, ULC, ASTM, etc. Be familiar and comply with or exceed the requirements of these standards. Failure to comply may result in rejection of the work and the need to replace or repair at no additional cost.

.2 In case of conflict or discrepancy, the more stringent requirements shall apply.

16.1 CODES

.1 Comply with the most recent versions of: The building Code Act, as amended; The Ontario Building Code and all supplements, as amended and all other Regulations and By-Laws of the authorities having jurisdiction an amendments thereto. All after are referred to 'Code'. Where Code or Contract Documents do not cover a particular requirement then conform to the National Building Code of Canada and all supplements.

.2 In case of conflict or discrepancy, the more stringent requirements shall apply.

17.1 SHOP DRAWINGS, SAMPLES, CONTROL PANELS

.1 Throughout the specifications, requirements are listed for the submission of drawings, samples and control panels or unit materials. The General (or Principal) Contractor is responsible for the submission and receipt of acceptances and approvals to ensure unnecessary work delays.

.2 Adjustments made on shop drawings by the Owner or Owner's Consultant are not intended to change the Contract Price.

18.1 INSPECTION AND TESTING

.1 Make arrangements for, and pay for, required inspections or tests specified or as required by governing authorities.

.2 Submit 2 copies of inspection and test reports promptly to the Owner.

.3 Allow sufficient time and access for the Owner or the Owner's Consultant to inspect the work or analyze test results.

.4 Do not proceed until written approval of inspection or testing is issued by the Owner.

19.1 **HEALTH AND SAFETY**

.1 Abide by the provisions of all Acts, Regulations pertaining to health and safety including Occupational Health and Safety Act R.S.O. 1986 Chapter 304 and Amendments, Ontario Regulation 214/91 and Amendments, Workplace Hazardous Materials Information System (W.H.M.I.S.) regulation, Ontario Regulation 644/88.

.2 Maintain on site a list of all hazardous materials (as required by WHMIS Regulation) proposed for use on site together with current Material Safety Data Sheet (MSDS). Supply the Owner with a current copy of the list and MSDS sheets.

.3 Label all hazardous materials according to the requirements of WHMIS.

.4 The Contractor shall have written spill response procedures and material on-site to respond to pollutants and contaminants into the natural environment in excess of levels permitted in regulations or to cause or likely to cause an adverse effect.

.5 The Contractor shall post all appropriate job site signs, notices, instructions and safety requirements in English and/or graphic symbols for the duration of the work.

19.1 **CO-ORDINATION**

.1 Examine requirements of materials, labour and equipment standards for the work of this contract.

.2 Ensure that where the work of one trade is to be built-in or is to be incorporated into or is dependent on the work of another trade, provide material, labour and equipment so as to avoid work delays.

.3 Ensure that installations, individually and collectively fully comply with contract requirements.

.4 The Architect or Engineer's may issue additional drawings to help with execution of the work, however these drawings are issued for clarification only and shall have the same meaning and intent as the Contract Documents and shall be included in the Contract Documents.

20.1 **SUBSTITUTIONS AND APPROVED EQUALS**

.1 **All Tenders are to be base strictly upon the items and suppliers specified in/on the Contract Documents. Refer to HWDSB General Information Section, 3. Substitutions (1,2,3) for Contractor suggested alternate suppliers or materials.**

.2 Approved alternate supplier and materials may be approved by the Consultants and Owner after the Contract is awarded but only due to the following circumstances; Suppliers or materials are no longer available or cannot be ordered and/or produced with-in the Owner's timeframes for project completion including but no limited to interim dates for project phases; the proposed alternate supplier and material meets the same quality and performance

standards as specified and will result in a credit amount to the Contract value. Any approved substitutions shall result in no extra costs to the Owner.

.3 The Owner also reserves the right not to accept or allow any substitutions to Suppliers or Products specified in the Contract Documents if they do not meet the Owner's standards of quality, and performance.

21.1 CLEANING AND DISPOSAL

.1 Provide on-site dump containers in location approved by Owner, for collection of waste materials and rubbish.

.2 Maintain premises free from debris and waste material on a daily basis. Remove all waste materials from site. Do not burn or bury materials on site and do not dispose of materials into storm or sanitary sewers.

.3 Dispose of all recyclable waste materials at recycling storage/handling facilities, where such facilities exist within 70 kilometers of site.

.4 Co-ordinate and supervise the completion operations of each trade. Provide a clean-up team to carry out the final clean-up of finished surfaces as required for immediate use after acceptance.

.5 During Final Cleaning of all exposed to view surfaces. Remove all grease, dust, stains, labels, protection materials, fingerprints, from all finished exposed to view surfaces including all glass and mirrors, use cleaning products that are recommended by the manufactures and approved by the owner. Clean all finished flooring according to manufacturer's instruction. Clean and seal all rubber cove base material. Clean all light fixtures, reflectors and lenses complete. Broom clean and power wash, if necessary all existing exterior paved surfaces and rake clean all other surfaces of the grounds effected by the work operations. Remove all debris and surplus materials from concealed accessible spaces. Replace any broken or scratched glass or mirrors. Repair any new damaged quartz surfaces. Replace with new final filters all mechanical equipment operated during construction. Clean all work with appropriate apparatus and cleaning materials in accordance with applicable specification sections and manufacturer's recommendations. Upon completion of final cleaning, remove all equipment, tools, materials and debris from building and site ready for occupancy by Owner.

22.1 AS-BUILT DRAWINGS AND CLOSEOUT DOCUMENTS

.1 The Contractor shall have on-site (2) sets of drawings for recording progressive recording of any items deviating from the drawings, including but not limited to change orders, site instructions, hidden or unknown conditions, underground utility locations, field changes in dimensions and details, locations of existing structural, mechanical and electrical building systems and related components not otherwise shown on drawings. etc. not otherwise shown on the drawings

These changes shall be recorded in red ink or pencil and upon completion shall reflect 'as-built conditions.

.2 At the completion of the work and before final acceptance the General Contractor shall transfer all as-built on-site hand marked up information and supply Architectural, Structural, Mechanical and Electrical as-built drawings of the work in the latest autocad format. Digital autocad files will be supplied to the General Contractor by the Consultants. At no cost to the Consultants or Owner.

.3 Some trades must maintain records and provide as-built, operating and maintenance information for 'as-built' drawings, digital files, operating and maintenance manuals. Throughout the progress of the work, ensure that these are properly recorded. Assemble and forward the required information, timed to prevent delay in final acceptance.

.4 Submit a set of drawings to the Consultants for review. Make any necessary changes and then submit (2) sets of drawings and (1) digital autocad files on USB Drive for presentation to the Owner.

.5 Submit (1) digital files on USB Drive as well as (1) PDF copy and (1) copy of Operating and Maintenance documents in 3 ring letter size loose leaf vinyl hard covered binders, with Title sheet labeled ‘Operating and Maintenance Data Manual’ Organize into tabbed sections parallel to project specification layout for presentation to the Owner. All information to be neatly typed in English. Include but not limited to the following: Any equipment which includes an extended warranty will be listed in a separate section at the beginning of the manual, clearly labelled and including the vendor contact information, description of the equipment or material and the warranty period. Maintenance instructions for finished surface and material; copy of hardware schedule, paint colour formulas, and interior and exterior colour and finish schedules; description, operation, and maintenance instructions all equipment and systems, including complete list of equipment parts. Indicate name plate information such as; make, model, serial number, size and capacity etc.; names, addresses and phone numbers of Sub-Contractors and Suppliers. Also refer to Owner’s Front End Documents.

.6 The General Contractor, Mechanical Contractor and Electrical Contractor, shall each note a $2,500.00 hold back amount in their progress draws to cover final submission of all as-built drawings, Operation and Maintenance Manuals. Holdback values will be released upon final Consultant review and approval of documents for presentation to the Owner.

.7 See section below for Guarantees and Warranties

23.1 CONSTRUCTION MEETINGS AND MINUTES

.1 The General Contractor shall conduct all construction meetings on a bi-weekly basis or as determined by the Consultant and shall record and distribute all minutes of those meetings in a timely manner no longer than 72 hours after the meeting. Up to date construction time schedules shall be presented at the beginning of the work and on a monthly basis after.

24.1 **ALLOWANCES**

.1 Expend Cash Allowances only as directed and authorized by the Architect and confirm in writing. Supply detailed and itemized costs for all Allowances in writing for the Architect's review and approval prior to proceeding with the work.

.2 Unexpended amount(s) of cash allowances may be reallocated to other cash allowances at the sole discretion of the Architect.

.3 Refer to Owner's General Conditions for applicable Overhead and Profit mark-up. Note Overhead and Profit mark-up is not allowed on the carried cash allowance, however if the cash allowance expenditure exceeds the carried sum then Overhead and Profit will be allowed on the amount(s) over.

.4 The following Cash Allowance(s) shall be included in the Total Contract lump sum price by the General Contractor and include:

.1 Building Automation System components for new electrical and mechanical equipment.

.2 Supply new life safety devices if the existing life safety devices are not able to be reinstalled (note installation is included in base bid.)

.3 Exterior Playground Line painting.

TOTAL CASH ALLOWANCE of **$25,000.00 Cad Dollars**
(To be included in the HWDSB's 'Form of Tender' document)

25.1 **GUARANTEES, WARRANTIES AND BONDS**

.1 Expedite the preparation and submission of warranties, particularly extended period warranties, as specified.

.2 Provide warranties that are fully executed and notarized.

.3 Include the following: Name and Address of project(s): Guarantee and Warranty commencement date (certificate or report of final Completion); duration of Guarantee and Warranty; clear indication and description of what is being covered and what remedial action will be taken if Guarantee and/or Warranty needs to be invoked by Owner: and signage and seal of General Contractor.

.4 This information shall be included with-in the Closeout Documents.

-End-

Appendix A – Construction School Specific Information Sheet Sample

In addition to the terms and conditions of the Contract Documents, the Contractor shall follow the protocols of the Construction Site Specific Information Sheet, sample provided below.
A completed version of this document, with site specific content, will be provided to the Contractor at the pre-construction meeting.

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Facilities Management

Construction School Specific Information Sheet

1. School Information:

School Name:	Insert School Name
Bell Times	
Morning (School Entry)**:**	0:00 AM
Afternoon (School Dismissal):	0:00 PM
Aftercare Program Dismissal:	6:00 PM
Caretaking Phone Number:	000-000-0000
Caretaking Hours	
September to June	6:00 AM – 10:00 PM
December Holiday Break	6:00 AM – 2:00 PM
March Break	6:00 AM – 2:00 PM
July to August	6:00 AM – 2:00 PM
Saturday / Sunday	CLOSED
PasWord Account Code:	HP0000
Security Panel Code:	0000

2. School Entry for afterhours, school holidays or closures:

Please follow these steps upon entry to the building outside of caretaker hours and on school holidays or closures:

1. Call PasWord Protection at 1-800-561-3099 or 905-522-6680 and notify them in advance of the day(s) and time(s) that access to the building will be required. They will require the PasWord account code noted above.
2. Disarm the security panel when arriving.
3. Arm the security panel when leaving.
4. Call PasWord to verify that the building is armed and secure.

Failure to follow this procedure outside of caretaker hours and on school holidays or closures will result in an automatic dispatch of a security guard to the building to verify who has entered/exited the building. Security costs associated with the dispatch of a security guard for failing to follow the procedure will be expensed to the contractor responsible for the incident.

3. Fire Safety Plan and Procedures:

The following procedures are to ensure the safe evacuation of the job site and school in the event of a fire alarm:

1. All employees, subcontractors, workers, and all visitors to the site are to review and follow the Hamilton Wentworth District School Board (HWDSB) posted room specific evacuation cards and school specific Fire Safety Plan located in the main office, on the health & safety board and in the fire manual binder (see caretaker).
2. Construction hoarding, fencing and temporary exits are to be implemented to ensure all fire routes are maintained for safe exiting.
3. In the event of a fire alarm, all construction activities must stop and all site personnel are to vacate the building and job site.
4. All site personnel are to meet at the predetermined meeting area as identified in the contractor's fire safety plan. contractor fire safety plan to be submitted with the Health & Safety submittals upon construction initiation.

4. Fire Alarm Bypass Protocols:

Please follow these steps to put the fire alarm on bypass. The FA system should not be put on test at any time. The following protocols are established by the HWDSB Fire Safety Plan and in the event that there is a discrepancy in a procedure the HWDSB Fire Safety Plan shall govern.

1. Contractor to contact Hamilton Fire Control (HFC) per the contact information below and make arrangements to review the site requirements for bypass – i.e. complete a walkthrough with HFC to determine which devices need to be bypassed, if any, if a device/s is/are to be red capped and protected from construction debris or damage, if a rate-of-rise device is to be installed or device disconnected and how to address the trouble on the panel.

   Contact: Michael Fleet - Hamilton Fire Control
   Phone: (905) 527-7042
   Email: michael@hamiltonfirecontrol.ca

2. Hamilton Fire Control to coordinate fire alarm bypass with HWDSB caretaker and PasWord.
3. The caretaker will post a notice that the school is on Fire Watch on the exterior doors. This is required anytime that the fire alarm Panel is in trouble, a fire alarm device is bypassed or impeded in any way (i.e. disconnected, gloved, red capped, etc.).
4. The caretaker will contact PasWord and the school main office to notify them the system is on bypass.
5. The contractor is to take all necessary precautions during this period to protect any FA devices in the construction zone from activating the emergency fire alarm system, including not conducting heat/smoke generating activities in proximity to the detectors (i.e. do not solder near the detector, protect devices from

debris/ dust, disconnect device when required to perform work that may activate the emergency fire alarm system).

6. The contractor is responsible for Fire Watch at all times within the construction area including at any time that a fire alarm device is affected (i.e. disconnected, bypassed, trouble on the panel, device is red capped or gloved). The contractor must maintain and make available a copy of the hourly fire watch log. Fire Watch during unoccupied times is not required.
7. The caretaker will be responsible for Fire Watch within the occupied area of the school up to the delineation of the construction work area during occupied times when a fire alarm device is affected. Fire Watch during unoccupied times is not required.
8. In the event a fire alarm device is activated, all occupants of the school, including contractors, must follow the HWDSB Fire Safety Protocol and Fire Safety Plan and Procedures as outlined in this document, and evacuate the school.
9. The caretaker is responsible to notify the Fire Department should there be a trouble on the panel for longer than 72 hours.

5. Please follow these steps for planning any service (electrical, gas, water) shutdowns:

A. Internal Localized System/Service Shutdowns:

1. Localized shutdowns **require minimum 3 days' notice** to HWDSB project supervisor for coordination with the school facility and staff.
2. Shutdowns must be completed outside of school bell times/operational hours which vary by facility and must be scheduled for evenings after 6:00 PM, weekends or board holidays.
3. If a shutdown will impact the security system, the contractor shall contact PasWord Protection at 1-800-561-3099 or 905-522-6680 and notify them in advance of the day(s) and time(s) of the shutdown.
4. If a shutdown impacts the fire alarm system, the contractor shall follow the Fire Alarm Bypass Protocol, section 4 above.
5. If required, the contractor is to coordinate with Board vendor/s to be on site to ensure boilers, roof top units, heat pumps, etc. are functioning properly after service disruption has concluded.

    - Chamberlain Building Services Inc - info@chbs.ca, 905-664-1914 or
    - Union Boiler Company Limited - info@unionboiler.com, 905-528-7977

6. Process will vary based on services shutdown and ability to localize shutdown.

B. Complete School System/Service Shutdowns:

1. Complete building shutdowns **require minimum 5 days' notice** to HWDSB project supervisor.
2. Shutdowns must be completed outside of school bell times/operational hours which vary by facility and must be scheduled for evenings after 6:00 PM, weekends or board holidays.
3. Contractor to contact PasWord Protection at 1-800-561-3099 or 905-522-6680 and notify them in advance of the day(s) and time(s) of shutdown.
4. During the shutdown, the contractor is responsible for following Fire Alarm Bypass Protocol, section 4 above.
5. The contractor is to coordinate with Board vendor/s to be on site to ensure boilers, roof top units, heat pumps, etc. are functioning properly after service disruption has concluded.

    - Chamberlain Building Services Inc - info@chbs.ca, 905-664-1914 or
    - Union Boiler Company Limited - info@unionboiler.com, 905-528-7977

6. HWDSB project supervisor will coordinate with other HWDSB departments to ensure all systems (IIT, security, communications) are up and running after service disruption has concluded.
7. If required, HWDSB project supervisor will coordinate with City of Hamilton staff if site has shared facilities such as recreation centre, community centre, pool or library, etc.
8. Process will vary based on service shutdown.

C. Heating and Cooling System Shutdowns:

1. Heating and cooling system shutdowns **require minimum 5 days' notice** to HWDSB project supervisor
2. Shutdowns must be completed outside of school bell times/operational hours which vary by facility and must be scheduled for evenings after 6:00 PM, weekends or board holidays.
3. The contractor is to coordinate with Board vendor/s to be on site to ensure boilers, roof top units, heat pumps, etc. are functioning properly after service disruption has concluded.

    - Chamberlain Building Services Inc - info@chbs.ca, 905-664-1914 or
    - Union Boiler Company Limited - info@unionboiler.com, 905-528-7977

4. If the boiler system is drained, the contractor upon refilling the system, is responsible for coordinating Board approved chemical treatment vendor to treat water.

    - Aquarian Chemicals Inc - info@aquarianchemicals.com, 905-825-3711

5. Process will vary based on services shutdown and ability to localize shutdown.

D. Asbestos Abatement and Designated Substance Related Work:

HWDSB

Capital Projects
Facilities Management

Construction School Specific Information Sheet

1. Designated substance related work **requires minimum 5 days' notice** to HWDSB project supervisor.
2. Designated substance related work in occupied areas must be completed outside of school bell times/operational hours which vary by facility and must be scheduled for evenings after 6:00 PM, weekends or board holidays.
3. Process will vary based on services shutdown and ability to localize shutdown.

DOOR HARDWARE

Section 08710

PROJECT: HWDSB – Viscount Montgomery Public School
1525 Lucerne Avenue
Hamilton, ON, Canada
L8K 1R3

CONTRACTOR:

ARCHITECT: Richard G. Butterworth Inc.
127 Judith Crescent
Ancaster, Ontario, Canada
L9G 1L3

CONSULTANT: Robert Rowarth AHC
William Knell & Company Limited
2090 Shirley Drive
Kitchener, ON , Canada
N2B 0A3

Date: March 21, 2023

Manufacturer List

Code	Name
CGA	Gallery
CSC	Schlage
MISC	Miscellaneous

Finish List

Code	Description
C26D	Satin Chrome
C32D	Satin Stainless Steel

Hardware Schedule

HEADING #01

1	Single Door #D1	Existing Corridor 106 from Existing Gymnasium 118		90°	RHR
1	Single Door #D2	Existing Corridor 106 from Existing Gymnasium 118		90°	RHR

Opening Description: 3' 4" x 7' 0" x Existing SCWD x Existing WDF

Re-use existing hardware except:

2	Kick Plate	GSH 80A 12" x 38" WS	C32D	CGA

HEADING #02

1	Single Door #D3	Existing Gymnasium 118 from Existing Office 117		90°	LHR
1	Single Door #D4	Existing Gymnasium 118 to Existing Boys Washroom 118A		90°	RH

Opening Description: 2' 8" x 7' 0" x Existing SCWD x Existing WDF

Re-use existing hardware except:

2	Kick Plate	GSH 80A 12" x 30" WS	C32D	CGA

HEADING #03

1	Pair Doors #D5	Existing Gymnasium 118 to Existing Storage 118B		90°	RHA

Opening Description: 2 - 2' 8" x 7' 0" x Existing SCWD x Existing WDF

Re-use existing hardware except:

2	Kick Plate	GSH 80A 12" x 31" WS	C32D	CGA

HEADING #04

1	Pair Doors #D6	Existing Gymnasium 118 from Existing Storage 118D		90°	LHRA

Opening Description: 2 - 3' 0" x 7' 0" x HMD x WDF

6	Hinges	LH179 4-1/2” x 4”	C26D	CGA
2	Flush Bolts	GSH 401 – 12”	C26D	CGA
1	Deadlock	L9463P – mount at 48” C/L	C26D	CSC
1	Cylinder	by HWDSB		MISC
1	Cylinder Pull	GSH 980	C26D	CGA
2	Kick Plate	GSH 80A 12" x 34" WS	C32D	CGA

HEADING #05

1	Single Door #D7	Existing Gymnasium 118 to Existing Washroom 118G		90°	LH

Opening Description: 2' 6" x 7' 0" x Existing SCWD x Existing HMF

Re-use existing hardware except:

1	Kick Plate	GSH 80A 12" x 28" WS	C32D	CGA

HEADING #06

1	Pair Doors #D8	Exterior from Existing Gymnasium 118		90° LHR/RHR

Opening Description: 2 - 2' 8" x 7' 0" x Existing SCWD x Existing HMF

Re-use existing hardware except:

2	Kick Plate	GSH 80A 12" x 31" WS	C32D	CGA

HEADING #07

1	Single Door #D9	Existing Gymnasium 118 to Existing Office 119A
1	Single Door #D10	Existing Gymnasium 118 to Existing Office 119

Opening Description: 2' 8" x 7' 0" x Existing SCWD x Existing WDF

DOORS TO BE FIXED IN PLACE

===== END OF SCHEDULE =====

1.1 General

.1 This section specifies general requirements and summarizes the work to be completed under the Contract. Additional requirements may be specified in individual sections of the specifications or shown on the drawings. All work to be completed in accordance with applicable sections of the 2010 edition of the Fishburn Building Sciences Group Inc. – Roof Construction Guide and Architectural Specifications and Drawings.

.2 The General Contractor shall act as the prime Contractor for the project, and shall be solely responsible for the means, methods, techniques, sequences, and procedures used in the performance and for the coordination of various parts of the work. The roofing Contractor shall coordinate with the General Contractor and all the subcontractors as required to provide a finished roofing system.

.3 Execute work in accordance with the Contract Documents, which shall govern the work specified herein.

.4 Provide plant, labour, materials and applicable taxes for the renovation work set out, including all related roofing, insulation, flashings, carpentry, electrical and mechanical work in accordance with drawings, details and specifications.

.5 Contractor must comply with latest recommended guidelines for the implementation of WHMIS. Ensure labels and data sheets for all specified materials are available for review and posting. **Odourless kettles to be used.**

.6 Provide incidental items that are not specifically specified or shown but are required by implications or references to make a complete and watertight assembly.

.7 The Contractor must observe guidelines regarding set-up and protection restrictions and requirements, which will be strictly enforced.

.8 The following description of various roof section work requirements are intended to be complete, but shall read in conjunction with the subsequent divisions of this specification, Architectural Specifications and Drawings, the Roof Plan(s) and details shown on the Roof Plan(s). In the event of any discrepancy, the more stringent requirements shall apply.

1. Contractors must verify location of security system, electrical and mechanical services below or within the deck and/or roofing system to ensure no damage occurs during securement of the roofing system to the structure. Any damages incurred will be the responsibility of the Contractor.
2. Contractors to provide Owner twenty-four (24) hours notice prior to disconnecting or shutting down any equipment and services for approval. If required, arrangements must be made to complete work after hours or weekends to ensure no disruption of the Owner's schedule.
3. Monitor fumes and air control on a regular basis to ensure no disruptions inside the building. Contractor to fabricate and temporarily install extensions to air intakes and protect all building openings to prevent fumes from entering the building. These installations must be suitable as not to interrupt Owner's schedule and be fixed in place to protect the vents from wind and precipitation. In the event that fumes entering into the buildings cannot be prevented, notify the Owner and Consultant to arrange for the completion of work after hours or on weekends.
4. Roofing Contractor to provide a minimum 2400 mm (8'-0") high enclosure around the work set-up area that will remain upright for the duration of the Contract. Remove enclosure after completion of work. Refer to Fishburn Roof Construction Guide.
5. Roofing Contractor is responsible for submitting a safety policy or procedure to the Owner prior to starting work. Comply with latest edition of the Board's Health and Safety Procedures.
6. The Roofing Contractor is responsible to check and report any drains which are not operational or in good working condition. General Contractor is responsible for unplugging existing drains, and ensuring all drains are operational overnight.
7. Roofing and General Contractors are to coordinate work of new addition and area of deck replacement to ensure building is watertight at all times.

1.2 Existing Assembly

.1 Information on existing construction and services, if provided, shall be used as a guideline only. The Contractor is responsible for confirming the existing measurements and conditions.

.2 The Contractor shall make no claim against the Architect, Owner or Consultant for the correctness or completeness of information provided.

Tar and Gravel Surface
4 Ply Felt and Tar
25 mm (1") Fibreboard assumed
76 mm (3") Insulation assumed
Vapour Retarder assumed
Steel Deck

1.3 Removal and Reroofing – Gym 118 roof at New Mechanical Unit

.1 ***Removal – To be read in conjunction with Sections 01500 and 02075***

1. Vacuum all debris and loose gravel from roof as specified in Section 02075.
2. Remove existing roofing, insulation, scuppers, membrane and metal flashings and accessories to expose the deck in areas designated. On Roof Section 101, General Contractor to remove existing roofing and deck to facilitate installation of new decking.
3. To ensure deck is clean of all debris, use vacuum to achieve successful results.
4. Protect the interior of the building as required from contamination of debris or water that could result from the removal or construction operations.
5. Dispose of all debris off site in approved disposal site. Notify Owner/Architect/ Consultant of any deck found damaged or corroded and provide repairs as required to restore all surfaces to good condition. Provide unit prices on Form of Tender to complete repairs as required.
6. Examine deck conditions and report any damage or suspect areas to Owner/Architect/Consultant. Repair or replace damaged areas of deck to specified requirements and on site direction.

.2 ***Alterations – To be read in conjunction with Sections 06101, 15000 and 16000***

1. Coordinate with General Contractor to complete mechanical, electrical, carpentry and miscellaneous alterations to Fishburn Roof Construction Guide, Architectural Specifications and Drawings.
2. During installation of new decking on Roof Section 101, General Contractor to coordinate with Roofing Contractor to keep building watertight at all times. Two-ply vapour barrier on concrete deck can be used as a temporary roof.
3. Comply with all sub trade codes.
4. Mechanical Contractor to remove and relocate existing gas line on Roof Sections 102 and 202. Roofing Contractor to supply and install new supports.

.3 ***New Roof Installation – To be read in conjunction with Section 07510***

New Assembly	
Surfacing	Gravel set in Asphalt
Metal Flashing	24-gauge Pre-finished
Membrane Flashing	4 Ply Organic Felt
Membrane	4 Ply Organic Felt
Cap Insulation	12 mm (0.5") Fibreboard
Separation Sheet	1 Ply Type IV Glass Felt
Base Insulation	63 mm (2.5") Polyisocyanurate (Secured) (Mopped)
Vapour Retarder	Kraft or 2 plies of No. 15 Felt and Asphalt

1. Install new built-up roof and related flashings in area designated on the drawings and details, conforming to the Fishburn Roof Construction Guide, Architectural Specifications and Drawings, specified requirements and herein described.
2. Protect all building and mechanical/electrical services at all times.
3. **Note: Check underside of deck prior to mechanically securing wood blocking and insulation to ensure no damage is done to services on or under the steel deck. If potential problems become evident, notify Owner/Architect and Consultant. Notify Owner in advance when mechanical securement will be completed so that services can be monitored to observe whether or not they have been severed or damaged. Protect the building services at all times and adjust operations as required to ensure work progresses without delays or additional cost**.
4. On steel deck, install vapour barrier set in full bed of roller applied fire retardant adhesive and continuously seal laps with roller applied adhesive. All side laps shall occur on top flute of deck and be shingled up slope. On concrete deck install vapour barrier consisting of 2 plies of No. 15 felt set in Type III asphalt.
5. On steel deck, install 63 mm (2.5") polyisocyanurate insulation set in sprinkle mopping of Type III asphalt to specified requirements. Mechanically secure insulation to meet Factory Mutual 1-90 rating, as per Manufacturer's approved layout. At perimeter and corners increase fasteners per FM requirements. **Caution: Ensure fasteners do not penetrate underside of deck by more than 25 mm (1.0") and that services located or attached to the underside of the deck will not be damaged. Adjust procedures to accommodate site conditions**. On concrete deck set base insulation in full mopping of Type III asphalt.
6. At areas of ponding water provide drainage channels by cutting polyisocyanurate insulation. Back cut insulation to provide a minimum of 900 mm (3'-0") wide sloped channel from low point to drain. Check elevation with level and straight edge. Ensure positive slope to drain is achieved, adjust mechanical fastener length to suit and accommodate cut insulation thickness.
7. Install 1 ply Type IV glass felt separation sheet and cap insulation, both set in Type III asphalt. When circumstances prevent entire system from being completed the same day withhold cap insulation, install an additional ply of glass felt in Type III asphalt and glaze for overnight protection.
8. Install 4 plies No. 15 organic felt membrane and gravel pour set in asphalt.
9. Install 4 plies of No. 15 felt membrane flashings set in Type III asphalt.
10. Flash all incidental roof projections to specified requirements and details.
11. At locations where "ponding" is greater than 6 mm (0.25") a double pour of asphalt and gravel is to be set so that ponding will be disbursed to nearest drain. Contractor is to allow for 5% of the total roof area in the original bid.
12. Replace existing drains with new Thaler RD-4C copper drain to suit size of existing plumbing. Where accessible, Mechanical Contractor to connect drains to plumbing with Fernco connectors; otherwise, connect new drains to existing rain water leader with U-Flow Connections to Owner's instructions. Provide sloped insulation to form sump each side of drain as shown on the Tapered Insulation Plan to promote positive drainage to detail and specified requirements. All new drains on Roof Sections 101, 102, 201 and 204 are to be supplied and installed by Roofing Contractor. Mechanical Contractor to supply and install new plumbing and connections. When ordering new drains, ensure that the drain outlets are of sufficient length to extend below deck level to permit plumbing connections.
13. Where shown on the Roof Plan, remove existing mechanical equipment and roof penetrations, provide deck closures to details and roof over.
14. Provide new gas pipe support to details and specified requirements.
15. Remove and reset roof hatches to details.
16. In the event that the Owner does not proceed with entire reroofing program, the Roofer will be advised and requested to allow for the tie-ins of new roofing work to the existing roof assembly to provide a watertight assembly.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for demolition work shown on the drawings, described herein, or as necessary to complete the work.

.3 Before commencing demolition, contact utilities and authorities having jurisdiction. Carry out disconnections and cappings to their requirements employing tradesmen licensed for this work. Pay inspection and service fees.

.4 This includes co-ordinating the disconnection and capping of services, as follows:
- .1 Sanitary Sewers
- .2 Storm sewers
- .3 Water service
- .4 Electric power connections
- .5 Telephone connections
- .6 Cable TV connections
- .7 Gas service

1.2 Related Work Under Other Sections

None

1.3 Standards

.1 To Ontario Fire Code, Part 8, Demolition, including:
- .1 Shutting off and capping services
- .2 Providing fire watches as required
- .3 Management of combustible salvage, waste and rubbish
- .4 Protection of persons and properties
- .5 Maintenance of operable fire protection equipment
- .6 Maintenance of fire fighters access
- .7 Provision of fire extinguishing equipment
- .8 Maintenance of existing and/or temporary exits

.2 To CSA-S350-M1980 'Code of Practice for Safety in Demolition of Structures', the Ontario Occupational Health and Safety Act, WHMIS and regulations of authorities having jurisdiction.

1.4 Recording Existing Conditions

.1 After determining demolition methods, determine area of possible vibration. Carefully inspect beyond those adjacent areas. List potential damage spots [i.e. existing cracks, exposed glass, etc.] and photograph each for record purposes before starting work.

1.5 **Protection**

.1 Fully protect adjacent property and ensure free safe passage at all times.

.2 Provide necessary hoardings, braces, shoring, underpinning, railings, temporary covers, covered passageways, ramps, warning signs, visual and audible signals, as required to prevent movement, settlement or collapse of any adjacent services, sidewalks, driveways, trees, building or building parts.

.3 Protect the public and others at all times. Be liable for any damage and replace, repair, or make good immediately.

.4 Where sheet, trowelled or sprayed-on asbestos is being disturbed, provide protective equipment and use protective measures required by the Ontario Occupational Health and Safety Act, latest regulations and owner's requirements see instructions to bidder's.

PART 2 - PRODUCTS

N/A

PART 3 - EXECUTION

3.1 **Standards**

.1 Carry out demolition and reconstruction operations in accordance with the Canadian Construction Safety Code. Obtain and pay for any special permits. Do not use explosives or smashing type of mechanical wrecking devices without the Architect's written approval.

3.2 **Preparation**

.1 **Salvage Items:**

.1 Carefully remove the following materials and equipment; store and protect as directed by the Owner.

.1 See Drawings.

.2 Stack whole reusable items separately and clear of demolition operations. The Architect retains ownership of these items until inspected. Dispose of these items as directed by the Architect. Remove materials declared surplus from site and deliver balance as directed.

.3 Dispose of demolished, broken and non-reusable materials immediately from the site of operations. Remove contaminated and dangerous materials from the site immediately and dispose in a safe manner to minimize all dangers at the site or at disposal locations.

.4 Disconnect, cap and seal electrical, telephone, cable TV, sewage, drainage, water and gas lines in accordance with the rules and regulations of the authorities having jurisdiction; employ tradesmen licensed to carry out this work.

.5 Clearly paint, mark and post warning signs on lines to remain in service and promptly repair any damage to maintain active service.

3.3 Demolition Operations

.1 Carry out demolition work shown on the drawings in a systematic manner from roof to final grade as necessary to accommodate remedial, reconstruction or new work. Ensure work is supervised by an experienced, competent foreman at all times. Work on each floor level must be complete before commencing work on the supporting structure. If any part of the work becomes unstable, temporarily shore and support to prevent collapse.

.2 Demolish foundations and piers, to a minimum of 150 mm (6") below finish floor slab and make good floor slab flush with existing finished slab.

.3 Small pieces of concrete and masonry may not be used to back fill. Do not use organic or metallic materials for back fill.

.4 At the end of each days work, leave site in a safe condition so that no part is in danger of collapse. Do not stack salvaged materials or debris liable to overload any part of the structure.

.5 Minimize dust during demolition. Keep dust dampened at all times.

.6 Withdraw or flatten projecting nails as work proceeds.

.7 Do not sell or burn materials on site.

.8 Remove organic, metallic, contaminated or dangerous materials from the site and ensure safe disposal.

3.4 Completion

.1 Remove debris daily; use approved transport vehicles only to their safe load capacity and clean away spillage immediately. On completion, clean exposed surfaces and adjacent areas ready for reconstruction operations. Remove tools, equipment, trash, dust and dirt from the site of operations and leave in a broom-clean condition.

3.5 Existing Asbestos:

.1 Follow Section 028100 Abatement Specifications from Pinchin found in Division 1 General Conditions

-END-

PART 1 - GENERAL

1.1	**General**	.1	This section specifies general requirements and procedures for inspection of site conditions, removal and preparation of surfaces. Additional requirements may be specified in individual sections of the specifications.
		.2	This section specifies general requirements and procedures form removal and preparation related to roofing work. Additional requirements may be specified in individual sections of the specifications.
1.2	**Related Work**	.1	Division 1 General Requirements Division 2 Site Construction Division 5 Metals Division 6 Wood and Plastics Division 7 Thermal and Moisture Protection Division 15Mechanical Division 16Electrical
1.3	**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 are maintained at all times.
		.2	Refer to Section 07510, paragraph 1.4.2.
1.4	**Pre and Post Inspection, and Recording Site Conditions**	.1	Inspect pre-construction surfaces and conditions that could be impacted by the work of this Contract.
		.2	The Contractor shall record all pre-construction conditions by photographs and/or video as determined by the Consultant.
		.3	This is to include all landscaping, traffic surfaces, storage set-up areas, exterior walls, roof, roof top equipment, interior surfaces including floor, walls, ceilings and the underside of all decks.
		.4	Contractor must notify the Owner/Consultant in writing of any pre-construction damage.
		.5	A post construction inspection shall be completed to determine whether any surface became damaged during the execution of work.
		.6	Photographs and/or videos will be used to assist resolution of disputes should they arise.
1.5	**Caution**	.1	Use extreme caution to ensure construction operation i.e. stockpiling of materials or use of construction equipment, will not impair the function of the deck or existing and finished work. Additional provisions are specified in Section 01040 of the Fishburn Roof Construction Guide.
1.6	**Summary of Work (Removal)**	.1	Prior to removing roofing, flashings or accessories, vacuum the roof surface. Work to be completed by Roof-Vac (905-791-0415) or approved equal. Roof should not be vacuumed more than 2 days prior to removal.
		.2	In conformity with Summary of Work, specifications and drawings, remove existing roofing assembly, associated accessories, related flashing and associated construction to the deck on Roof Sections 102, 201, 202 and 203. On Roof Sections 101, 102, 201 and 202 adjacent to new addition coordinate with General Contractor to keep buildings watertight at all times as required.
		.3	Remove only as much as can be replaced, made watertight and completed during the same work period.
		.4	On steel decks ensure flutes are cleaned of all debris. Use vacuum to ensure successful results.

.5 Stockpiling of debris on the roof will not be permitted. Keep the roof and site free of an accumulation of waste materials and rubbish.

.6 Schedule removal operations to minimize noise and protect the building, grounds, work, adjacent property and vehicular traffic from dust, debris and damage.

.7 When removing debris and working over sidewalks, roads, private or public property, conduct operations with mutual concern and in compliance with local ordinance.

1.7 Disposal

.1 Provide on-site containers for collection of waste materials and debris.

.2 Contractor will remove from site all surplus or waste material generated during the course of carrying out their contractual obligations (COMPLY WITH ALL RELEVANT FEDERAL AND PROVINCIAL REGULATIONS).

.3 Provide documentation that debris was delivered to on approved disposal site.

1.8 Inspect Existing Substrates

.1 Following removal of the roofing system and new deck installation, inspect surface conditions for contamination, soundness and corrosion.

.2 Provide immediate notification to the Owner /Architect of any deteriorated, corroded, rotten or unsound conditions and decking.

.3 Obtain a ruling from the Architect on the acceptability of surfaces and on corrective measures, if required.

.4 Do not proceed until all suspect conditions have been inspected and corrected.

.5 When any such conditions result in a delay of work, the Contractor shall receive an extension of time to complete the work but shall not be entitled for additional compensation due to the delay.

.6 The commencement of work is proof that the Contractor has accepted surfaces as satisfactory and accepts responsibility for appearance and performance of completed work.

.7 Defective work resulting from application of material on unsatisfactory surfaces will be considered the responsibility of the Contractor.

.8 The Contractor will be responsible to make good damage or defective work using materials and finish to match the original at the unit price submitted on the Form of Tender.

.9 Ensure adjacent construction and installation of related work is incorporated and completed.

1.9 Reinforce New Roof Openings

.1 General Contractor is responsible to provide openings for new equipment drains, etc. through the roof decks and reinforce per Architectural drawings and details. Coordinate work with General Contractor to maintain watertight building.

1.10 Existing Deck Repairs

.1 Where applicable include on the Form of Tender a unit price to adjust the cost of work included in base bid.

1.11 Preparation of Tie-ins

.1 In conformity to Summary of Work, drawings and specifications, prepare bitumen membrane for tie-in to existing roofs by removing gravel and bitumen for a minimum of 900mm (3'-0") on either side of the proposed repair area. Leave felts free of gravel, clean and undamaged. Dispose of chippings and debris away from site. Sweep back loose aggregate 900mm (3'-0") to prevent it from being tracked into the repair area. If Owner does not proceed with full replacement program, allow for tie-ins to remaining existing roofs to provide a watertight finished roofing system.

.2 Prior to commencing work, heat all membrane with hot air gun to flow bitumen to an even black surface in order to improve adhesion at points of contact.

.3 Repair all damage with materials and finish to match the original.

1.12 Clean and Paint Areas of Metal Deck Corrosion

.1 Clean metal deck, curbs or upstands free of surface corrosion by wire brushing.

.2 Confirm locations with Architect/Consultant before proceeding.

.3 Coat all areas of mild surface corrosion with brush-applied coat of zinc rich primer. Work primer into surfaces.

.4 Restrict foot traffic and roofing operations to insure primer is adequately dried to prevent damage. Reprime surfaces before continuing operations.

.5 Include in Form of Tender a unit cost to adjust the cost of the work for steel deck repairs.

-End-

PART 1 GENERAL

1.1 General and Related Work

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.

.2 Related work specified elsewhere:

.1 Section 02 82 00.01 Asbestos Abatement – Type 1 Procedures

.2 Section 02 82 00.02 Asbestos Abatement – Type 2 Procedures

.3 Section 02 82 00.04 Asbestos Abatement – Type 2 Glove Bag Method

.3 Site Conditions identifies all known hazardous building materials within the Project Area. The information provided is for general reference only. It is recommended each Contractor confirm existing conditions on site prior to tender close.

.1 The specification fulfils the requirements of Section 30 of the Ontario Occupational Health and Safety Act.

.2 The specification fulfils the requirements of the Section 10 of Ontario Regulation 278/05.

.4 The Outline of Work identifies the location, condition and quantities of hazardous building materials to be removed as part of this project.

.1 It is the intent that work prescribed this Section will result in the removal of all hazardous materials as outlined and the decontamination of all surfaces or materials which may have been or become contaminated by hazardous materials either during or prior to work of this Contract.

1.2 Site Conditions

.1 Refer to the report entitled “Hazardous Building Materials Assessment (Pre-construction), P01835 Corridor and Gymnasium Renovation Project, Viscount Montgomery Elementary School, 100 Wexford Avenue South, Hamilton, Ontario”, dated January 23, 2023, prepared by Pinchin Ltd., file number 303983.026.

1.3 Outline of Work

.1 Coordinate the following items with the Owner’s Project Manager and the Construction Manager, which is to be included in the abatement contractor’s scope of work, including but not limited to: electrical isolations, GFI connection, water connections, HVAC and exhaust ventilation system isolation, bin placement, schedule, disconnects, etc.

.2 Refer to the Contract Drawings for the extent of construction work and the Work Areas.

.3 Install Hoarding Walls between Abatement Work Areas and Occupied Areas as required.

.4 Using Type 1 procedures prescribed in the Section identified in Related Work, remove and dispose of the following where scheduled for removal:

.1 Asbestos-containing vinyl floor tiles in Gym 118 (Location 8696), and Storage 118C (Location 8699).

.1 Include vinyl floor tiles present under millwork.

.2 Asbestos-containing caulking around a vent on the roof.

.5 Using Type 2 procedures, with full enclosure, prescribed in the Section identified in Related Work, remove and dispose of the following using power tools equipped with an efficient HEPA filtered dust collection device where scheduled to be removed:

.1 All asbestos-containing Transite ceiling tiles, light fixtures, grids, supports, hangers, fibreglass insulation on top of tile, and all items affixed to Transite ceiling tiles.

.1 Turn over items removed to owner as required.
.2 Items not scheduled for removal and attached to the Transit ceilings, are to be disconnected, supported and protected during work.

.6 Using Type 2 Glove Bag procedures prescribed in the Sections identified in Related Work, remove and dispose of the following:

.1 All asbestos-containing pipe insulation and parging cement (pro-active removal, approximately 600 LF and 200 fittings) that is accessible and concealed above Transite ceiling tiles in the Gym 118 (Location 8696) and Storage 118C (Location 8699).

.1 Include to reinsulate with fibreglass and ASJ jacketing.

.2 If for reasons of pipe geometry or access, Glove Bag procedures cannot be used, remove and dispose of asbestos-containing insulations following Type 2 procedures for quantities under $1m^2$, or following Type 3 procedures in accordance with Ontario Regulation 278/05 for quantities over $1m^2$.

.7 Follow mercury procedures prescribed in the Sections identified in Related work when removing all light fixtures and fluorescent light tubes. Place all light fixtures into containers to avoid breakage.

.8 Following Polychlorinated Biphenyls (PCB) procedures, remove and dispose of PCB-containing ballasts.

.9 Refer to Specification Sections identified in the Related Work for specified personnel protective measures for the safe handling, removal, clean-up, of hazardous materials in each phase or work area.

.10 Visit the site prior to tender close to confirm the location and extent of any hazardous building materials or materials contaminated by hazardous materials.

.11 Protect surfaces, building fabrics and items remaining within the Abatement Work Area.

.12 Without disturbing hazardous materials, perform removals where required, prior to abatement work.

.1 Maximize waste diversion by use of resale of building materials, or recycling.

.13 Isolate the Abatement Work Area from adjoining Occupied and Non-Occupied Areas whether present at an interior or exterior location.

.14 Maintain emergency and fire exits from Abatement Work Area, or establish alternative exits satisfactory to Provincial Fire Marshall and local authorities having jurisdiction. Maintain extra routes from occupied areas. Place emergency exit signs at locations to clearly mark exit route. Seal emergency exit doors so as not to impede use of door during emergency evacuation.

.15 Remove, clean, store and replace at completion of work, non-operating mechanical and electrical equipment, ducts, building components, materials or items removed to accommodate asbestos removal.

.16 Remove and dispose of as appropriate waste, building components, materials and items contaminated by hazardous materials that cannot be effectively cleaned.

.17 Encapsulate remaining hazardous materials at locations where removal is deemed impractical by the Abatement Consultant.

.18 Final clean work area to remove visible signs of asbestos and other hazardous materials, other debris or settled dust.

.19 Apply lock-down agent to exposed surfaces throughout the work area and to surfaces from which any hazardous materials have been removed.

.1 Do not apply lock-down to materials which would be damaged by its application.

.20 Unless otherwise specified, the handling, removal, clean-up or repair of hazardous materials or surfaces contaminated with hazardous materials is to be performed following wet removal techniques.

1.4 Schedule

.1 Provide necessary manpower, supervision, equipment and materials to maintain and complete the project on schedule.

.2 Work Hours:

.1 Coordinate all work, scheduling and phasing with the Owner.

.2 Duration for which HVAC systems may remain shutdown to accommodate quiet hours work will vary in accordance with outside weather conditions and internal demand. Duration of quiet hours work will have to be scheduled accordingly and in consultation with the Abatement Consultant and Owner.

.3 Provide 48 hours written notice to the Abatement Consultant of any request to work outside normal working hours. Obtain written approval before proceeding.

1.5 Definitions

.1 Abatement Consultant: Owner's Representative providing inspection and air monitoring.

.2 Abatement Contractor: Contractor or sub-contractor performing work of this section.

.3 Abatement Work Area: Area where work takes place which will, or may, disturb hazardous materials.

.4 Amended Water: Water with wetting agent added for the purpose of reducing surface tension to allow thorough wetting of materials.

.5 Asbestos: Any of the fibrous silicates defined in Regulation 278/05 including: actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.

.6 Asbestos-Containing Material (ACM): Material identified under Site Conditions including any debris, overspray, fallen material and settled dust.

.7 Authorized Visitors: Building Owner, Abatement Consultant, or designated representative, and persons representing regulatory agencies.

.8 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with Regulation 278/05 and the Occupational Health and Safety Act, and has knowledge of the potential or actual danger to health and safety in the work.

.9 Contaminated Waste: Material identified under Site Conditions, including fallen material, settled dust, other debris and materials or equipment deemed to be contaminated by the Abatement Consultant.

.10 Curtained Doorway: Doorway consisting of two (2) overlapping flaps of rip-proof polyethylene arranged to permit ingress and egress from one room to another while permitting minimal air movement between rooms.

.11 DOP Test: A testing method used to determine the integrity of the Negative Pressure unit or vacuum using a Dispersed Oil Particulate (DOP) or Poly Alpha Olefin (PAO) HEPA filter leak test. This test is to be conducted on site where units are to be installed. Refer to the Environmental Abatement Council of Canada (EACC) DOP/PAO Testing Guideline 2013 or ANSI/ASME N510-2007.

.12 Fitting: Individual segments or pieces of a mechanical service line which may include but is not limited to the hangers, tees, elbows, joints, valves, unions, etc.

.13 Friable Material: Material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.

.14 HEPA: High Efficiency Particulate Aerosol filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.

.15 Mercury Waste: Equipment, materials or items containing mercury or contaminated with mercury.

.16 Milestone Inspection: Inspection of the Abatement Work Area at a defined point in the abatement operation.

.17 Non-Friable Material: Material that when dry cannot be crumbled, pulverized or powdered by hand pressure.

.18 Occupied Area: Any area of the building or adjoining space outside the Abatement Work Area.

.19 Personnel: All Contractor's employees, sub-contractors' employees, supervisors.

.20 PCBs: Monochlorinated or Polychlorinated Biphenyls (or any mixture of both).

.21 PCB Material: means solid material containing PCBs at a concentration of more than fifty milligrams per kilogram (mg/kg) or 50 parts per million (ppm), or liquid with greater than 2 mg/kg or ppm.

.22 PCB Waste: PCB Equipment, PCB Material, PCB Liquids and materials or items contaminated with PCBs.

.23 PCM: Phase Contrast Microscopy.

.24 Remove: Remove means remove and dispose of (as applicable type of waste) unless followed by other instruction (e.g. remove and turn over to Owner).

.25 TEM: Transmission Electron Microscopy.

1.6 Regulations and Guidelines

.1 Comply with Federal, Provincial, and local requirements, provided that in any case of conflict among those requirements or with these Specifications, the more stringent requirements shall apply. Work shall be performed under regulations in effect at the time work is performed.

.2 Where regulations are not present, follow accepted industry standards and applicable Guideline documents.

.3 Regulations and Guidelines include but are not limited to the following:

.1 Ministry of Labour Occupational Health and Safety Act Regulations for Construction Projects including Revised Statutes of Ontario 1990, Chapter 0.1 and Ontario Regulation 278/05.

.2 Ministry of the Environment and Climate Change Regulation for the disposal of waste, including R.R.O. 1990, Reg. 347 as amended.

.3 PCB Regulations, SOR 2008-273 and R.R.O. 1990, Reg 362.

.4 Regulation 490/09 Designated Substances.

.5 Environmental Abatement Council of Canada (EACC), Lead Guideline For Construction, Renovation, Maintenance or Repair, October 2014.

.6 Ministry of Labour, Guideline, Silica on Construction Projects, 2011.

1.7 Quality Assurance

.1 Removal and handling of hazardous materials is to be performed by persons trained in the methods, procedures and industry practices for Abatement.

.2 Ensure work proceeds to schedule, meeting all requirements of this Specification.

.3 Complete work so that at no time airborne dust, visible debris, or water runoff contaminate areas outside the Abatement Work Area.

.4 Any contamination of surrounding area (indicated by visual inspection or air monitoring) shall necessitate the clean-up of affected area, and in the same manner applicable to an Abatement Work Area at no cost to the Owner.

.5 All work involving electrical, mechanical, carpentry, glazing, etc., shall be performed by licensed persons experienced and qualified for the work required.

1.8 Supervision

.1 Provide on site for each work shift, a Shift Superintendent(s), who has authority regarding all aspects related to manpower, equipment and production.

.2 Supervisory personnel must hold a recognized certificate proving attendance at an asbestos removal training course (2 day minimum duration) and have performed supervisory functions on at least five (5) other asbestos abatement projects of similar size and complexity.

.3 At all times during work, the Shift Superintendent(s) must be on site. Failure to comply with this requirement will result in a stoppage of all work, at no cost to the Owner.

.4 Replace supervisory personnel, with approved replacements, within three (3) working days of a written request from the Owner. Owner reserves the right to request replacement of supervisory personnel without explanation.

.5 Do not replace supervisory personnel without written approval from the Owner.

1.9 Instruction and Training

.1 Instruction and training must be provided by a competent person.

.2 All workers completing Type 1, 2 or 3 asbestos abatement must be trained in compliance with Section 19 of O.Reg. 278/05.

.1 For Type 3 asbestos abatement, workers must be trained and certified per Section 20 of O.Reg. 278/05.

1.10 Notification

.1 Before commencing work, notify orally and in writing, an inspector at the office of the Ontario Ministry of Labour nearest the project site, where required.

.2 Inform all trades on site of the presence and location of hazardous materials identified in the Contract documents.

.3 Notify the Owner or Owner's Representative, the Joint Occupational Health and Safety Committee and the Provincial Ministry of Labour, if suspected asbestos-containing materials not identified in the contract documents are discovered during the course of the work. Stop work in these areas immediately.

.4 Notify Sanitary Landfill site as per O.Reg. 347/90 as amended.

1.11 Submittals

.1 Submit prior to starting work:

.1 Provincial Workers' Compensation Board Clearance Certificate.

.2 Insurance certificates.

.3 Copy of Company Health and Safety Policy and applicable programs.

.4 Ministry of Labour Notice of Project form.

.5 Copy of Certificate of Approval for disposal of hazardous materials waste and location of landfill.

.6 Pre-removal damage survey of the Abatement Work Area(s), waste transport routes, and bin storage areas

.2 Submit the following information regarding personnel prior to starting work:

.1 Proof in the form of a certificate that supervisory personnel have attended a training course on asbestos removal or are certified as supervisors under the Ministry of Training, Colleges and Universities course 253S.

.2 Written statement that personnel have had instruction on hazards of exposure to hazardous materials identified within this scope, the use of respirator, protective clothing, worker and waste decontamination procedures, and all aspects of work procedures and protective measures.

.3 WHMIS training certificates for all personnel.

.4 Certificate proving that each worker on site has been fit tested for the respirator appropriate for the work being performed.

.5 Proof of training for the following site specific hazards or conditions identified:

.1 Working at Heights
.2 Elevated Work Platform.

.3 Submit the following information regarding HEPA filtered devices prior to construction of enclosure or asbestos abatement:

.1 Performance data on HEPA filtered vacuums including DOP tests no more than 3 months old.

.2 Performance data on negative air units including DOP tests which must be no more than 3 months old if the unit is vented outdoors or which must be performed on site immediately prior to initial usage and when HEPA filters are changed if the unit is vented indoors.

.3 DOP tests to be performed by an independent testing company.

.1 DOP testing company is required to submit a detailed technical report of testing protocol, including Introduction, Methodology, Results, Conclusions, and Recommendations, including results of the Air-Aerosol Mixing Uniformity test as per ASME N510-1989 (1995).
.2 DOP testing company must also provide calibration certificates from an independent calibration firm or from the manufacturer of the testing equipment for both the aerosol photometer and the pressure gauge on the aerosol generator dated within 1 calendar year from the on-site testing date.
.3 DOP testing company must also provide the National Sanitation Foundation (NSF) certification name and number of the on-site technician performing the testing.

.4 Proof of calibration of DOP testing equipment.

.4 Submit the following prior to isolating the work area:

.1 Safety Data Sheets for chemicals or material used in the course of the Abatement Project.

.5 Submit the following upon completion of the work.

.1 Manifests, waybills, bills of ladings etc. as applicable for each type of waste.

1.12 Inspection

.1 From commencement of work until completion of clean-up operations, the Abatement Consultant is empowered by the Owner to inspect for compliance with the requirements of governing authorities, adherence to specified procedures and materials, and to inspect for final cleanliness and completion.

.2 The Abatement Consultant is empowered by the Owner to order a shutdown of work when leakage of asbestos from the controlled work area has occurred or is likely to occur.

.3 Any deviation from the requirements of the Specifications or governing authorities that is not approved in writing may result in a stoppage of work, at no cost to the Owner.

.4 Additional labour or materials expended by the Contractor to rectify unsatisfactory conditions and to provide performance to the level specified shall be at no additional cost to the Owner.

.5 Inspection and air monitoring performed as a result of Contractor's failure to perform satisfactorily regarding quality, safety, or schedule, shall be back-charged to the Contractor.

.6 Facilitate inspection and provide access as necessary. Make good work disturbed by inspection and testing at no cost to the Owner.

.7 Refer to the Sections identified in Related Work for specified milestone inspections which are to take place at defined points throughout the abatement operation specific to each phase or work area.

.8 Provide 24 hours written notice to the Abatement Consultant of any request for scheduling of milestone inspections or transportation of waste through Occupied Areas.

.9 The following Milestone Inspections may take place, at the Owner's cost, as outlined in each related specification section:

.1 Milestone Inspection - Clean Site Preparation

.1 Inspection of preparations and set-up prior to contaminated work in the Abatement Work Area.

.2 Milestone Inspection – Bulk Removal Inspection

.1 Inspection during asbestos removal, monitoring removal methods, site deficiencies, performing occupied air monitoring, etc.

.3 Milestone Inspection - Visual Clearance

.1 Inspection of Abatement Work Area after completion of all abatement, but prior to application of lock-down agents or dismantling of enclosure.

.10 Refer to the Sections identified in Related Work for specified milestone inspections which are to take place at defined points throughout the abatement operation specific to each phase or work area.

.11 Do not proceed with next phase of work until written approval of each milestone is received from the Abatement Consultant.

1.13 Air Monitoring - Asbestos

.1 Air monitoring will be performed using Phase Contrast Microscopy (PCM) following the National Institute for Occupational Safety and Health Method 7400.

.2 Co-operate in the collection of air samples, including providing workers to wear sample pumps for up to full-shift periods. Contractor will be responsible for the cost of testing equipment repairs or resampling resulting from the actions of the Contractor's forces.

.3 Results of PCM samples at or exceeding 0.05 fibres per cubic centimeter of air (fibre/cc) or greater, outside an Abatement Work Area, or from within the Abatement Work Area during or following Glove Bag Work, will indicate asbestos contamination of these areas. Respond as follows:

.1 Suspend work within the adjoining Abatement Work Area until written authorization to resume work has been received from the Abatement Consultant.

.2 Isolate and clean area in the same manner applicable to the Abatement Work Area.

.3 Maintain work area isolation, and repeat clean-up operations until visual inspection and air monitoring results are at a level equal to that specified.

.4 At the discretion of the Abatement Consultant provide additional negative air units at locations specified in response to elevated fibre levels being detected in the Clean Change Room or Occupied Areas.

.4 Results of PCM samples at or greater than 0.01 fibres per cubic centimeter of air (fibre/cc), collected within the Abatement Work Area enclosure after the site has passed a visual inspection, and an acceptable coat of lock-down agent has been applied, will indicate asbestos contamination of these areas. Respond as follows:

.1 Maintain work area isolation and re-clean entire work area. Then apply another acceptable coat of lock-down agent to exposed surfaces throughout the work area.

.2 Repeat above measures until visually inspected and air monitoring results are at a level equal to that specified

.3 Alternate to items above, the Asbestos Abatement Contractor can pay for analysis of PCM samples by Transmission Electron Microscopy (TEM) at NVLAP accredited laboratory.

.1 Enclosure to remain sealed, with negative pressure maintained, and subject to required daily inspections until TEM results are received.

.5 Additional labour or materials expended by the Contractor to rectify unsatisfactory conditions and to provide performance to the level specified shall be at no additional cost to the Owner.

.6 Cost of additional inspection and sampling performed as a result of elevated fibre levels in areas outside the Abatement Work Area or from within the work area following completion of work, will be back-charged to the Contractor.

1.14 Worker Protection

.1 Instruct workers before allowing entry to the Abatement Work Area. Instruction shall include training in use of respirators, dress, showering, entry and exiting from an Abatement Work Area, and all other aspects of work procedures and protective measures.

.2 Workers shall not eat, drink, chew gum or tobacco, vape or smoke in the Abatement Work Area.

.3 Workers shall be fully protected at all times when possibility of disturbance of hazardous materials exists.

.4 Provide soap, towels and facilities for washing of hands and face, which shall be used by all personnel when leaving the Abatement Work Area.

.5 Respiratory Protection

.1 Refer to each particular Section of the Specification for specified type of respiratory equipment specific to each phase or work area.

.2 Respirators shall be:

.1 Certified by the National Institute of Occupational Safety and Health (NIOSH) or other testing agency acceptable to the Ministry of Labour.
.2 Fitted so that there is an effective seal between the respirator and the worker's face. Ensure that no person required to enter an Abatement Work Area has facial hair which affects the seal between respirator and face.
.3 Assigned to a worker for their exclusive use.
.4 Maintained in accordance with manufacturer's specifications.
.5 Cleaned, disinfected and inspected by a competent person after use on each shift, or more often if required.
.6 Repaired or have damaged or deteriorated parts replaced.
.7 Stored in a clean and sanitary location.
.8 Provided with new filters as necessary, according to manufacturer's instructions.
.9 Worn by personnel who have been fit checked by qualitative or quantitative fit-testing.
.10 Instruction on proper use of respirators must be provided by a competent person as defined by the Occupational Health and Safety Act.

.3 Provide protective clothing, to all personnel which:

.1 Is made of a material that does not readily retain nor permit penetration of asbestos fibres or lead/silica dust.
.2 Consists of head covering and full body covering that fits snugly at the ankles, wrists and neck.
.3 Once coveralls are worn, treat and dispose of as contaminated waste.
.4 Is replaced or repaired if torn or ripped.

.4 Use hard hats, safety footwear and other protective equipment and apparel required by applicable construction safety regulations.

1.15 Visitor Protection

.1 Provide clean protective clothing and equipment to Authorized Visitors.

.2 Instruct Authorized Visitors in the use of protective clothing and Abatement Work Area entry and exit procedures.

.3 Authorized visitors are required to be fit tested on respirators, prior to entering Abatement Work Area.

.1 Respirator worn must be compliant with Section 13 and Table 2 of O.Reg. 278/05.

1.16 Signage

.1 Asbestos Abatement Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:

.1 There is an asbestos dust hazard.

.2 Access to the work area is restricted to persons wearing protective clothing and equipment.

.2 Vehicles, Bins and Asbestos Waste Containers: Post signs on both sides of every vehicle used for the transportation of asbestos waste and on every asbestos waste container. Signs must display thereon in large, easily legible letters that contrast in colour with the background the word "CAUTION" in letters not less than ten centimetres in height and the words:

.1 CONTAINS ASBESTOS FIBRES

.2 Avoid Creating Dust and Spillage

.3 Asbestos May be Harmful To Your Health

.4 Wear Approved Protective Equipment.

.3 Place placards in accordance with Transportation of Dangerous Goods Act.

1.17 Waste and Material Handling

.1 Waste bins must be placed on grade or in receiving.

.2 All bins for hazardous materials must be covered and locked when waste transfer is not being performed.

.3 Ensure redundant non-ACM, rubble, debris, etc. removed during contaminated work are treated, packaged, transported and disposed of as appropriate waste.

.4 Clean, wash and apply Post Removal Sealant to metal waste prior to removal from Abatement Work Area. Recycle metals.

.5 Clean, wash and apply Post Removal Sealant to non-porous materials prior to disposal as clean waste. Obtain prior written approval from the Abatement Consultant for each individual type of material.

.6 Clean and wash equipment prior to removal from Abatement Work Area if removed prior to completion.

.7 Place all equipment, tools and unused materials that cannot be cleaned in Abatement Waste Containers.

.8 As work progresses, and at regular intervals, transport the sealed and labelled waste containers from the Abatement Work Area to waste bin.

.9 Place items in bins according to waste classification. Place asbestos waste, lead waste, metals, non-asbestos waste, etc. in separate bins.

.10 Removal of waste containers and decontaminated tools and materials from the Abatement Work Area shall be performed as follows:

.1 Remove any visible contamination from the surface of non-porous or cleanable waste being removed from the Abatement Work Area. If the item can be cleaned, remove it from the site as clean waste.

.2 Place waste or item in Waste Container and seal closed.

.3 Wet wipe outside of Waste Container.

.4 Within Decontamination Facility, Transfer Room or at the perimeter of the Abatement Work Area, place in second Waste Container. Seal closed.

.5 Remove waste containers and transport to appropriate bin.

.11 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with Owner. Use a closed, covered cart to transport through Occupied Areas.

.12 Provide workers transporting waste with means to access full personal protective equipment and all tools required to properly clean up spilled material in the case of a rupture of a Waste Container.

.13 Pick-up and drop off of garbage bin shall be at pre-approved times, and must not interfere with the Owners operations.

.14 Transport hazardous waste to landfill or waste transfer station licensed by the provincial Ministry of the Environment.

.15 Cooperate with the provincial Ministry of the Environment inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to the Owner.

1.18 Re-establishment of Objects and Systems

.1 Re-establish objects and items relocated by the Contractor's workforce to facilitate work.

.2 Re-establish electrical, communication, HVAC and other services previously disconnected or otherwise isolated to accommodate work by this Section.

.3 Make good at completion of work, all damage not identified in pre-removal survey.

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

.1 Refer to the Sections identified in Related Work for specified materials, equipment or facilities specific to each phase or work area.

.2 Materials and equipment must be in good condition and free of debris and fibrous materials. Disposable items must be of new materials only.

.3 Airless Sprayer: AC powered pressure washer that allows wetting agent to mix with water, uses no air or compressed air, and has a nozzle to regulate power and pressure.

.4 Amended Water: Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of materials.

.5 Asbestos Waste Container: A container acceptable to disposal site, Ministry of the Environment, and Ministry of Labour, comprised of the following:

.1 Dust tight.

.2 Suitable for the type of waste.

.3 Impervious to asbestos.

.4 Identified as asbestos waste.

.6 HEPA Vacuum: Vacuum with necessary fittings, tools and attachments. Discharged air must pass through a HEPA filter.

.7 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints.: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints.

.8 Post Removal Sealant (or Lockdown): Sealant that when applied to surfaces serves the function of trapping residual asbestos fibres or other dust. Product must have flame spread and smoke development ratings both less than 50. Product shall leave no stain when dry. Post Removal Sealant shall be compatible with replacement insulation or fireproofing where required and capable of withstanding service temperature of substrate. Apply to manufacturer’s instructions.

.9 Protective Clothing: Disposable coveralls complete with head covering and full body covering that fits snugly at the ankles, wrists and neck.

.10 Rip-Proof Polyethylene Sheeting: 8 mil (0.20 mm) fabric made up from 5 mil (0.13 mm) weave and two (2) layers of 1.5 mil (0.05 mm) poly laminate or approved equal. In sheet size to minimize on-site seams and overlaps.

.11 Sprayer: Garden type portable manual sprayer or water hose with spray attachment if suitable.

.12 Tape: Duct tape or tape suitable for sealing polyethylene to surfaces under both dry and wet conditions in the presence of Amended Water.

.13 Wetting Agent: Non-sudsing surfactant added to water to reduce surface tension and increase wetting ability.

PART 3 EXECUTION

.1 Refer to the Sections identified in Related Work for specified procedures for work area preparation, maintenance, site dismantlement, application of lock-down agent and all other procedures for the safe handling, removal and clean-up of hazardous materials specific to each phase or work area.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.

.2 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.

.2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Type 1 or Low Risk procedures, and Pinchin and Owner specific requirements.

1.3 Personal Protection

.1 Protect all personnel at all times when possibility of disturbance of ACM exists.

.1 Provide non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters when requested by personnel.

.2 When requested by personnel, provide protective clothing.

.2 Provide protective clothing, to all personnel entering the Abatement Work Area.

.3 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Inspections

.1 Refer to Section 02 81 00 – General Provisions.

.2 The following Milestone Inspections are to be scheduled:

.1 Milestone Inspection - Clean Site Preparation

.2 Milestone Inspection – Bulk Removal Inspection

.3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

.1 Refer to Section 02 81 00.

PART 3 EXECUTION

3.1 Site Preparation

.1 Remove stored or non-fixed items from the Abatement Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.

.2 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.

.3 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.

.4 Install one layer of rip-proofing polyethylene sheeting over one layer of polyethylene sheeting on walls, floors, finishes, millwork, electrical equipment, equipment and

furnishings remaining in the Abatement Work Area.

.5 Install polyethylene drop sheets below areas of work.

.6 Install polyethylene sheeting on openings in walls and floors (as required) and seal.

.7 Install signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

.8 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.

.1 Lock-out/tag-out power at electrical panels.

.2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.

.9 Provide power from ground fault interrupt circuits.

.10 Shut down HVAC systems serving the Abatement Work Area.

.1 Install polyethylene sheeting over openings in ducts and diffusers and seal.

.2 HVAC to remaining areas of building must not be disrupted during work of this section.

.3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.

.4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.

.11 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc).

.12 Without disturbing asbestos-containing materials, remove and dispose of non-hazardous materials as clean waste prior to asbestos removal work, where possible.

3.2 Maintenance of Abatement Work Area

.1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.

.2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.

.3 Maintain Abatement Work Area in tidy condition.

.4 Remove any standing water on polyethylene/floor at the end of every shift.

.5 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.3 Asbestos Removal - General

.1 Do not use powered tools or non-hand held tools.

.2 Do not use compressed air to clean or remove dust or debris.

.3 Do not break, cut, drill, abrade, grind, sand or vibrate ACM if it cannot be wetted. Type 2 procedures would be required if the material cannot be wetted due to hazard or damage.

.4 Wet ACM prior to work and keep ACM wet throughout the removal process.

.5 Frequently and at regular intervals during the work, clean up dust and waste using HEPA

vacuums and/or wet sweeping or mopping.

.6 Frequently and at regular intervals, place all waste in asbestos waste containers.

.7 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.4 Asbestos Removal - Vinyl Asbestos Tile

.1 Wedge a heavy duty scraper in seam of two adjoining tiles and gradually force edge of one tile up and away from floor. Do not break off pieces of tile, but continue to force balance of tile up.

.2 Place tile, without breaking into smaller pieces, into Asbestos Waste Container.

.3 Force scraper through tightly adhered areas by striking scraper handle with a hammer.

.4 Heat tile thoroughly with a hot air gun until heat penetrates through tile and softens adhesive in areas where scraper will not remove tile.

.5 HEPA vacuum floor on completion of work in area.

3.5 Asbestos Removal - Removal of Caulking

.1 Wet all material to be disturbed.

.2 Undo fasteners if necessary to remove material.

.3 Break material only if unavoidable, and wet material if broken during work.

.4 Use only non-powered hand-held tools to remove ACM.

.5 Scrape to remove material adhered to substrate.

.6 Place removed ACM directly into an asbestos waste container.

3.6 Abatement Work Area Dismantling

.1 Wash or HEPA vacuum equipment and tools used in contaminated Abatement Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Abatement Work Area.

.2 Place tools and equipment used in contaminated work site but not cleaned in polyethylene bags prior to removal from Abatement Work Area.

.3 Clean polyethylene sheeting and drop sheets which with HEPA vacuum or wet cleaning methods at completion of work.

.4 Wet drop sheets and polyethylene sheeting.

.5 Carefully roll polyethylene sheeting and drop sheets toward the centre. As polyethylene is rolled away, immediately remove visible debris beneath with a HEPA vacuum.

.6 Remove remaining polyethylene sheeting and tape.

.7 Place polyethylene sheeting, drop sheets, tape, disposal clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.

3.7 Waste and Material Handling

.1 Refer to Section 02 81 00.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.

.2 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.

.2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Type 2 or Moderate Risk procedures, and Pinchin and Owner specific requirements.

1.3 Personal Protection

.1 Protect all personnel at all times when possibility of disturbance of ACM exists.

.2 Provide the following minimum respiratory protection to all personnel:

.1 Full face respirators with P100 high efficiency (HEPA) cartridge filters, for:

.1 Removal of all or part of a ceiling if asbestos is likely lying on the surface.

.2 Use of a HEPA filtered power tool on non-friable ACM if the material is not wetted.

.2 Non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.

.3 Provide protective clothing, to all personnel entering the Abatement Work Area.

.4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Inspections

.1 Refer to Section 02 81 00 – General Provisions.

.2 The following Milestone Inspections are to be scheduled:

.1 Milestone Inspection - Clean Site Preparation

.2 Milestone Inspection – Bulk Removal Inspection

.3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

.1 Refer to Section 02 81 00.

2.2 Hoarding Walls

.1 Type A Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, or other suitable methods.

2.3 Transfer Room

.1 Transfer Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size

accordingly to accommodate number of workers.

.2 Install walls as follows:

.1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.

.2 Install one layer rip-proof polyethylene sheeting on interior walls of Transfer Room.

.3 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting beneath entire Transfer Room.

.4 Install one layer rip-proof polyethylene sheeting over roof.

.5 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.

.6 Install a fire extinguisher, mount to wall.

2.4 Curtained Doorways

.1 Construct as follows:

.1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Transfer Room.

.2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.

.3 Install weights attached to bottom edge of each door flap.

.4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Site Preparation - General

.1 Remove stored or non-fixed items from the Abatement Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.

.2 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.

.3 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.

.4 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.

.1 Lock-out/tag-out power at electrical panels.

.2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.

.5 Provide power from ground fault interrupt circuits.

.6 Shut down HVAC systems serving the Abatement Work Area.

.1 Install polyethylene sheeting over openings in ducts and diffusers and seal.

.2 HVAC to remaining areas of building must not be disrupted during work of this section.

.3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.

.4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.

.7 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc).

3.2 Site Preparation –Enclosure Required

.1 Install polyethylene enclosure complete with Windows at Abatement Work Areas for the following work:

.1 Removal of friable asbestos-containing materials (less than 1 square metre).

.2 Removal of a false ceiling (or part of) where asbestos-containing material is presumed or known to be present on the surface.

.2 Install Transfer Room where duration of work is to last longer than one 8 hour shift.

.3 Seal openings in floor using tape, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.

.4 Construct Hoarding Walls between Abatement Work Area perimeter and occupied areas, as required.

.5 Install 6 mil polyethylene sheeting on walls within the Abatement Work Area., including existing walls that make up, or are within, the Abatement Work Area.

.6 Provide a completely sealed polyethylene top for free standing enclosures.

.7 Extend to underside of ceiling system, enclosures for access into ceilings. Enclosure may be supported from the ceiling system if ceiling can support the polyethylene.

.8 Install Curtained Doorways.

.9 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged. Items to remain include but are not limited to:

.1 Millwork.

.2 Doors.

.3 Bulkheads.

.4 Toilet Partitions.

.5 Plumbing fixtures.

.6 Electrical Equipment.

.7 Mechanical Equipment.

.10 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.

.11 Establish negative pressure in Abatement Work Areas as follows:

.1 Provide sufficient HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Abatement Work Area a minimum of every 20 minutes.

.2 Provide additional HEPA filtered negative pressure machines as required to ensure air flow from Occupied Area into Abatement Work Area.

.3 Arrange negative air units to maximize the distance between units and decontamination facilities.

.4 Provide weighted flaps in perimeter Hoarding Walls as necessary to provide

make-up air.

.5 Operate HEPA filtered negative pressure machines continuously from first disturbance of ACM until completion of dismantling.

.6 Replace prefilters to maintain specified flow rate.

.7 Replace HEPA filter as required to maintain flow rate and integrity of unit.

.8 Discharge HEPA filtered negative air machines as follows:

.1 To building exterior.

.1 Remove existing glazing where necessary and replace with a 19 mm plywood panel.

.2 Install panel securely in window frame so that it cannot be pushed into the building and make weather-tight with caulking.

.3 For each negative pressure unit, provide a 300 mm diameter, screened, duct opening through panel.

.4 Direct discharge away from building access points.

.5 Reinstall glazing to match existing upon completion of work.

.2 Into Occupied Areas as required.

.1 Install and make airtight all negative air discharge ducting.

.2 Use metal reinforced polyethylene discharge ducting in locations where the ducting must be protected from damage or collapse.

.12 Place required tools to complete the abatement with the Abatement Work Area.

.13 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

3.3 Site Preparation – No Enclosure Required

.1 Install caution tape around work area where existing walls are not present.

.2 Cover walls, floors, finishes, millwork, equipment and furnishings remaining in the Abatement Work Area with polyethylene sheeting before disturbing ACM to control the spread of dust.

.3 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged. Items to remain include but are not limited to:

.1 Millwork.

.2 Doors.

.3 Bulkheads.

.4 Toilet Partitions.

.5 Plumbing fixtures.

.6 Electrical Equipment.

.7 Mechanical Equipment.

.4 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

.5 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.

.6 Place HEPA vacuum in Abatement Work Area.

.7 Place required tools to complete the abatement with the Abatement Work Area.

3.4 Maintenance of Abatement Work Area

.1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.

.2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.

.3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.

.4 Maintain Abatement Work Area in tidy condition.

.5 Remove standing water on polyethylene/floor at the end of every shift.

.6 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.5 Asbestos Removal - General

.1 Do not use compressed air to clean or remove dust or debris.

.2 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.

.3 Frequently and at regular intervals, place all waste in asbestos waste containers.

.4 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.6 Asbestos Removal – Thermal Systems Insulation (less than 1 Square Metre)

.1 Construct an enclosure around Abatement Work Area and use the procedures described above under *Site Preparation –Enclosure Required*.

.2 Adequately wet exterior of the ACM with amended water to suppress dust.

.3 Remove asbestos-containing mechanical insulations in layers, maintaining all exposed surfaces of insulation in a wet condition.

.4 Remove wetted ACM directly into waste containers. Do not allow ACM to fall to the floor of the Abatement Work Area.

.5 Clean all surfaces from which ACM has been removed with scouring pads, vacuuming or wet-sponging to remove all visible material after completion of removal of ACM.

.6 Remove visible dust and debris.

.7 Seal exposed ends of asbestos-containing insulation to remain, with canvas and lagging.

.8 HEPA vacuum or wet clean entire Abatement Work Area, including any surfaces not covered with polyethylene sheeting. Any materials removed to access ACM that are to be re-used, and any abatement equipment, must be wet cleaned or HEPA vacuumed prior to completion.

.9 Apply Post Removal Sealant to all surfaces within the Abatement Work Area including those from which ACM has been removed.

3.7 Asbestos Removal - Transite Ceiling Tiles with HEPA Filtered Power Tools

.1 Use the procedures described above under *Site Preparation –No Enclosure Required*.

.2 Wet all material to be disturbed.

.3 Turn on HEPA vacuum. Vacuum to remain operational throughout work.

.4 Place removed ACM directly into an asbestos waste container.

.5 IF power tool can disconnect from HEPA vacuum, remove tool, and HEPA vacuum tool and bit, blade, etc, and shrouds.

.6 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.8 Application of Post Removal Sealant

.1 Apply one coat of Post Removal Sealant with an airless sprayer, in accordance with Manufacturer's Instructions, to cover all surfaces on all items in the Abatement Work Area, including but not limited to polyethylene, ACM substrate, structural steel, and surfaces scheduled for demolition.

.2 Do not apply post removal sealant to materials that will be damaged by its application.

3.9 Abatement Work Area Dismantling

.1 Wash or HEPA vacuum equipment and tools used in contaminated Abatement Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Abatement Work Area.

.2 Place tools and equipment used in contaminated work site but not cleaned in polyethylene bags prior to removal from Abatement Work Area.

.3 Clean polyethylene sheeting and drop sheets which with HEPA vacuum or wet cleaning methods at completion of work.

.4 Wet drop sheets and polyethylene sheeting.

.5 Carefully roll polyethylene sheeting and drop sheets toward the centre of enclosure. As polyethylene is rolled away, immediately remove visible debris beneath with a HEPA vacuum.

.6 Remove remaining polyethylene sheeting and tape, and dispose of as asbestos waste.

.7 Place polyethylene sheeting, drop sheets, tape, disposal clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.

.8 Remove remaining site isolation, seals, tape, etc.

.9 Remove Transfer Room.

.10 Remove seals, tape, Signage etc.

.11 Immediately upon shutting down negative air units, seal air inlet grill and exhaust vent with polyethylene and tape.

.12 Seal openings in HEPA vacuums.

.13 Remove and dispose of the pre-filters from HEPA filtered negative pressure machines as asbestos waste.

.14 Remove HEPA filtered negative pressure machines and discharge ducting or HEPA vacuums.

.15 Remove temporary lights.

.16 Remove ground fault panels.

.17 Place contaminated materials including polyethylene sheeting, drop sheets, seals, tape, disposable coveralls, and other contaminated waste in asbestos waste containers.

3.10 Waste and Material Handling

.1 Refer to Section 02 81 00.

3.11 Re-Establishment of Items

.1 Upon completion of work:

.1 Remove and disconnect Ground fault Panel, tags and locks from electrical panels and re-energize equipment and items.

.2 Remove negative air discharge panel and reinstall glazing to match existing.

.3 Clean, mop and vacuum Abatement Work Area Decontamination Facilities.

.4 Enable building air handling systems.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.

.2 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.

.2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Glove Bag procedures, and Pinchin and Owner specific requirements.

.3 If for reasons of pipe temperature, geometry or access, Glove Bag procedures cannot be used, remove and dispose of asbestos-containing insulations as per Section 02 82 11 for less than 1 square meter, or following Type 3 procedures in accordance with Ontario Regulation 278/05 for greater than 1 square meter.

1.3 Personal Protection

.1 Protect all personnel at all times when possibility of disturbance of ACM exists.

.2 Provide the following minimum respiratory protection to all personnel:

.1 Non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.

.3 Provide protective clothing, to all personnel entering the Abatement Work Area.

.4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Inspections

.1 Refer to Section 02 81 00 – General Provisions.

.2 The following Milestone Inspections are to be scheduled:

.1 Milestone Inspection - Clean Site Preparation

.2 Milestone Inspection – Bulk Removal Inspection

.3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

.1 Refer to Section 02 81 00.

.2 Glove Bag: Prefabricated bag which provides a completely sealed envelope surrounding a given section of piping to permit the removal of asbestos-containing insulation from within the bag while maintaining the integrity of the bag and preventing the spread of airborne asbestos fibres. The glove bag shall be equipped with,

.1 sleeves and gloves that are permanently sealed to the body of the bag to allow the worker to access and deal with the insulation and maintain a sealed enclosure

throughout the work period,

.2 valves or openings 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,

.3 a tool pouch with a drain,

.4 a seamless bottom and a means of sealing off the lower portion of the bag, and

.5 a high strength double throw zipper and removable straps, if the bag is to be moved during the removal operation.

.3 Securing Straps: For some types of Glove Bag, reusable nylon straps at least 25mm wide with metal tightening buckle for sealing ends of bags around pipe and/or insulation.

PART 3 EXECUTION

3.1 Site Preparation - General

.1 Remove to the extent necessary to access piping, stored or non-fixed items from the Abatement Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.

.2 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.

.3 Shut down HVAC systems serving the Abatement Work Area.

.1 Install polyethylene sheeting over openings in ducts and at diffusers and seal.

.2 HVAC to remaining areas of building must not be disrupted during work of this section.

.3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.

.4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.

.4 Install caution tape around work area where existing walls are not present.

.5 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

.6 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.

.7 Cover walls, floors, finishes, millwork, equipment and furnishings below the pipe to be worked on in the Abatement Work Area with polyethylene sheets before disturbing ACM. Drop sheets shall extend a minimum of 1,800 mm from pipe.

.8 Use existing lighting or install temporary lighting to a level that will provide for safe and efficient use of work area - minimum 550 LUX.

.9 Provide Amended Water for wetting ACM, in garden sprayers. Provide one garden sprayer for each worker.

.10 Do not used compressed air to clean or remove and dust or debris when completing work of this section.

.11 Place HEPA Vacuum in Abatement Work Area for each worker.

.12 Place required tools to complete the abatement within the Abatement Work Area.

.13 Post Notice of Project, where required by O.Reg. 278/05.

3.2 Maintenance of Abatement Work Area

.1 Maintain Abatement Work Area in tidy condition.

3.3 Glove Bag Removal

.1 Do not use Glove Bags on hot pipes that may damage Glove Bag. Refer to manufacturer's limitations.

.2 Prior to use of Glove Bag on damaged or unjacketed insulation:

.1 Spray any areas of damaged insulation jacketing with mist of Amended Water.

.2 Tape over damaged insulation to provide temporary repair.

.3 Mist areas of insulation with no jacketing and wrap with polyethylene sheeting and seal with tape.

.3 Place any tools necessary to remove insulation in tool pouch built into Glove Bag.

.4 Inspect the Glove Bag for damage and defects immediately before it is attached to the pipe or duct.

.1 If damage or defects are observed, dispose of Glove Bag.

.5 Install Glove Bag as per manufacturer's instructions.

.6 Remove metal jacketing or banding carefully. Do not damage the Glove Bag.

.7 Remove insulation from pipe as per manufacturer's directions.

.1 Volume and weight of insulation must not exceed capacity of the Glove Bag or supports.

.2 Arrange insulation in the Glove Bag to maximize use of the Glove Bag.

.8 Only glove bags designed to be moved may be re-used on other sections of pipe or moved down same section of pipe (e.g. Safe-T-Strip).

.9 At regular intervals during its use, if damage or defects are observed during the use of the Glove Bag, which cannot be readily repaired with tape and not affect the integrity or strength of the glove bag.

.1 Discontinue use of Glove Bag.

.2 Wash inner surface of Glove Bag.

.3 Wet insulation.

.4 Pull an Asbestos Waste Container over Glove Bag before removing from pipe.

.5 Remove Glove Bag and Asbestos Waste Container, seal with tape.

.6 Place in a second Asbestos Waste Container and seal with tape.

.7 Clean immediate area with a HEPA Vacuum prior to resuming work.

.10 If bag is to be moved along pipe for use on adjacent section of insulation:

.1 Wash inner surface of Glove Bag.

.2 Wash tools and place tools in pouch.

.3 Wet surface of insulation in lower section of bag and any exposed end of asbestos insulation remaining on pipe with Amended Water.

.4 Insert nozzle of HEPA filtered vacuum cleaner into bag through valve and evacuate air from bag.

.5 Seal closure strip.

.6 Loosen securing straps to maintain a loose seal of Glove Bag to insulation or pipe.

.7 Use double throw zipper as necessary to pass hangers.

.8 Tighten straps once bag is in new position and continue insulation removal until Glove Bag is full, work is completed on the pipe or an obstruction prevents further movement of the bag.

.11 If bag is to be removed from a pipe for use on a new section of pipe, perform the following:

.1 Wash inner surface of Glove Bag.

.2 Wash tools and place tools in pouch.

.3 Wet surface of insulation in lower section of bag and any exposed end of asbestos insulation remaining on pipe with Amended Water.

.4 Insert nozzle of HEPA filtered vacuum cleaner into bag through valve and evacuate air from bag.

.5 Seal valve cover on valve Glove Bags.

.6 Seal closure strip.

.7 Wash top section of Glove Bag and tool pouch thoroughly.

.8 Undo securing straps, unfasten zipper and carefully move bag to new section of pipe.

.12 To remove bag after completion of insulation removal operation:

.1 Wash inner surface of Glove Bag.

.2 Wash and place all tools in one hand (glove), pull hand out inverted, twist to create a separate pouch, tape inverted hand at two separate locations 25 mm apart so as to seal pouch.

.1 Remove inverted hand and tools by cutting between the two tape seals.

.2 Place inverted hand pouch and tools into the next clean Glove Bag to be used or into a water bucket, open pouch underwater and clean tools.

.3 Wet surface of insulation in lower section of bag and any exposed end of asbestos insulation remaining on pipe with Amended Water.

.4 Insert nozzle of HEPA filtered vacuum cleaner into bag through valve and evacuate air from bag.

.5 Seal valve cover on valve Glove Bags.

.6 Seal closure strip if equipped with one. Twist bag at tapered point and secure with tape.

.7 Pull an Asbestos Waste Container over Glove Bag before removing from pipe.

.1 Undo straps and unzipper, or cut upper portion of single-use Glove Bag.

.2 Seal Asbestos Waste Container with tape.

.8 Ensure pipe is clean of all residue after removal of Glove Bag. If necessary, after removal of each section of asbestos, vacuum all surfaces of pipe, using HEPA vacuum or wipe with wet cloth.

.13 Seal all surfaces of freshly-exposed pipe with Post Removal Sealer.

.14 Cover exposed ends of any remaining asbestos insulation with canvas and lagging using

Type 2 Procedures.

3.4 Clean-Up and Dismantling

.1 Clean and remove from Abatement Work Area:

.1 Equipment and tools.

.2 Temporary lighting if used.

.3 Polyethylene seals from HVAC systems.

.2 Place polyethylene sheeting, drop sheets, seals, tape, clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.

.3 Clean Abatement Work Area with HEPA vacuums or wet wiping/mopping.

.4 Seal openings in HEPA vacuums.

.5 Proceed with the dismantlement of all barricades, etc. following receipt of authorization to proceed from the Asbestos Abatement Consultant.

.6 Remove barricades, fencing, caution tape, signs, etc.

3.5 Waste and Material Handling

.1 Refer to Section 02 81 00.

3.6 Re-Establishment of Items

.1 Upon completion of work:

.1 Move all items that were removed from Abatement Work Area prior to work, back into same location within Abatement Work Area.

.2 Remove tags and locks from electrical panels and re-energize equipment and items.

.3 Enable building air handling systems.

.4 Clean and vacuum Abatement Work Area.

END OF SECTION

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HWDSB,ViscountMontgomery,Reno,HAZ,ASSMT\Deliverables\Specs\303983.030 02 82 00.04 Glove Bag Viscount HWDSB Feb 15 2023.docx

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for cast-in-place concrete as shown on the drawings, described herein, or as necessary to complete the work.

1.2 Related Work Under Other Sections

.1 Section 03350: Concrete Finishing, [co-ordinating work with this section.]

.2 Section 06100: Rough Carpentry, [co-ordinating work with this section.]

.3 Division 15: Mechanical, [install all mechanical inserts.]

.4 Division 16: Electrical, [install all electrical inserts.]

1.3 Applicable Codes and Standards

.1 Comply with requirements of Ontario Building Code, Ontario Occupational Health and Safety Act and municipal building By-laws and Regulations.

.2 Except where modified by the drawings, conform to the following:

STANDARD	**TITLE**
ACI 301	Tolerances of Concrete Construction.
CAN/CSA-A23.1-M90	Concrete Materials and Methods of Concrete Construction.
CAN3-A23.1-1S1-1986	
CAN3-A23.1-1S2-86	
CAN/CSA-A23.2-M90	Methods of Test for Concrete.
CAN3-A23.3-M84	Design of Concrete Structures for Buildings.
CSA -G30.12-M1977	Billet-Steel Bars for Concrete Reinforcement.
CAN/CSA-A5-M88	Portland Cements.
CAN3-A266.1-M78	Air-Entraining Admixtures for Concrete.
CAN3- A266.2-M78	Chemical Admixtures for Concrete.
CAN3- A266.4-M78	Guidelines for the use of Admixtures in Concrete.
CRSI	Manual of Standard Practice.

1.4 Inspection and Testing

.1 Owner will arrange and pay for material testing and compaction tests of subgrade and granular base courses in accordance with Division 1: General Requirements.

.2 Notify testing agency of concreting schedule.

1.5 Certificates

.1 Submit to Architect certification showing that plant, equipment, and all materials to be used in concrete are in accordance with CAN/CSA-A23.1-M90, Concrete Materials and Methods of Concrete Construction, CAN3-A23.1S1-1986, CAN3-

A23.1S2-86 and that mix design is adjusted to prevent alkali aggregate reactivity problems.

1.5 **Co-ordination and Co-operation**

.1 Co-operate with other trades on concrete related work. Give other trades all information regarding materials or items supplied by this trade and affecting work of other trades.

.2 Leave chases, openings and slots as required. Build in hangers, anchors, sleeves and accessories supplied by others.

.3 If not noted on the structural drawings, obtain the Architect's approval for cutting holes in concrete for pipe or duct passage.

.4 To ensure proper levelling, provide dry-pack concrete grout under beam and column bearing plates.

.5 Prior to placing concrete footings or skim slabs, give the Architect's timely notice for inspection of sub-soil by a soils engineer. Do not place concrete until approval received.

.6 Give the Architect minimum 24 hours notice of time when reinforcement will be completed and ready for inspection.

1.6 **Delivery, Storage and Handling**

.1 Deliver and store materials undamaged in dry area, stacked to allow free air circulation. Store materials in accordance with CAN/CSA-A23.1-M90.

.2 Deliver items to site in the largest practical sections and tag or mark (chalk only) items for identification.

.3 Store reinforcing steel on racks or skids. Protect from dirt or other materials. Maintain steel in the fabricated form.

.4 Store forms off ground and provide adequate support to prevent warping or distortion. Protect from contamination by oil, grease, water, earth, etc.

.5 Replace all items received in damaged condition and/or as deemed to be defective by the Architect.

1.7 **Examination**

.1 Examine all surfaces and conditions upon which the work of this section depends. Report all discrepancies to the Architect.

.2 Examine all drawings, showing work of other trades on which this work is in any way dependent, and report to the Architect any errors or discrepancies affecting this work.

1.8 **Cold Weather Concreting**

.1 Comply with CAN/CSA-A23.1-M90. Take necessary precautions when air temperature is at or is likely to drop below 5 degrees C (41 degrees F). Provide

temporary plant and equipment for heating concrete materials and forms. Maintain the proper temperature and humidity of the concrete during curing.

1.9 **Hot Weather Concreting**

.1 Comply with CAN/CSA-A23.1-M90. Take necessary precautions when air temperature exceeds 26 degrees C (78 degrees F).

1.10 **Special Protection**

.1 Provide temporary protection to interior of building during all times that the existing weatherproof surface has been disturbed prior to installing concrete.

.2 Prevent damage to building surfaces, landscape, asphalt paving, curbs, etc.

.3 Keep traffic off newly concreted areas until concrete has fully cured.

1.11 **Shop Drawings**

.1 Submit [4] copies of shop drawings, placing diagrams, bar lists and erection drawings, clearly showing the signed stamp of a professional structural engineer registered in Ontario.

PART 2 - PRODUCTS

2.1 **General**

.1 **Strength:** Concrete shall have minimum 28 day compressive strenghs as follows:

.1 30 MPa for all column footings, structural slabs, beams, columns and piers.

.2 25 MPa for wall footings, slabs on grade.

.2 **Air Entrainment:** Concrete shall have percentages of air entrainment as follows:

.1 5%-8% for all concrete subject to de-icing chemicals.

.2 3%-6% for exterior concrete subject to freezing and thawing.

.3 3% maximum for interior concrete subject to freezing and thawing.

2.2 **Materials**

.1 **Portland Cement:** To CAN/CSA-A5-M88, Type 10, Normal.

.2 **Mixing Water:** To CAN/CSA-A23.1-M90.

.3 **Fine aggregate:** To CAN/CSA-A23.1-M90, graded within to following limits.

.1 100% by weight passing a 10 mm ($^3/_8$") sieve.

.2 90% by weight passing a #4 sieve and not more that 8 - 30% by weight passing a No. 50 sieve.

.4 **Coarse Aggregate:** Crushed stone or gravel: To CAN/CSA-A23.1-M90. Maximum size 19 mm ($^3/_4$") ; for delamination repairs, maximum size 10 mm ($^3/_8$").

.5 **Air-Entraining Agent:** To CAN3-A266.1-M78.

Acceptable Products: Or Approved Equal

Conchem	'PROTEX AES'
Grace	'Darex AEA'
Master Builders	'MBVR'
Sika	'Sika AER'
Sternson	'NVR'
W. R. Meadows	'Sealtight AEA'

.6 **Water-reducing Agent (Superplasticiser), Non-retarding:** To CAN3- A266.2-M78, Type WN, CSA-A266.5-M1981 and CAN3- A266.6-M85.

Acceptable Products: Or Approved Equal

Conchem	'PDA 25XLR'
Grace	'WRDA-82'
Master Builders	'Pozzolith' (N)
Sika	'Sikament 300'

.7 **Curing Compounds:** To Section 03350: Concrete Finishing.

.8 **Epoxy Materials:** Reinforcement coating and new concrete bonding.

Acceptable Products: Or Approved Equal

Cappar	'Capbond E'
Conchem	'Pro Bond'
CPD Services	'2C Polysulphide Epoxy Adhesive'
Sika	'Sikudur 35 Hi Mod LV'

.9 **Polymer Materials:** Or Approved Equal

.1 Pre-packaged, pre-mixed polymer bonding material.

Acceptable Products:

Cappar	'Acrylic Latex No. 12'
CC Chemicals	'Acrylic conc Adhesive'
Conchem	'XL Bond'
CPD Services	'Styrene Butadiene & 20 min. set
Master Builders	'Acryl-Set'
Sika	'Sikatop 122'

.2 Use one of the foregoing and include oven dried aggregates in accordance with the manufacturers directions. Use products of one manufacturer only.

.10 **Pre-mixed Non-shrink Grout:** Minimum strength 40 MPa at 28 days. Maximum allowable shrinkage 0.4 percent. [If required in this section].

Acceptable Products: Or Approved Equal

CC Chemicals	'In Pakt' or 'Supertop' [no forms]
Conchem	'Super Grout 1000'
CPD Services	'Non-shrink Construction Grout'
Master Builders	'Master Flow 713'
Sternson	'Ferrogrout 939'
W. R. Meadows	'V-3 Grout'

.11 **Premoulded Joint Filler (Isolation/Expansion Joints):** Bituminous impregnated fibre to ASTM D1751-83, thickness and depth, indicated in this division and/or as shown on drawings.

Acceptable Products: Or Approved Equal

CPD Services	'Asphalt Fibre Board'
Sternson	'Sternboard'
W. R. Meadows	'Sealtight Fibre Joint'

.12 **Waterstops:** Extruded poly vinyl chloride waterstops to CGSB 41 GP 35M Type I and III, thickness and depth, indicated in this division and/or as shown on drawings.

Acceptable Products: Or Approved Equal

Sternson	'Durajoint'
W. R. Meadows	'Sealtight P.V.C.- Premium Grade'

.13 **Absorptive Cover:** Burlap cloth made from jute or kenaf, weighing approximately 300g/m^2 (9 oz/sq yd), complying with AASHTO M 182.

.14 **Curing Membrane:** To CAN/CGSB 51.34-M86, Type 1 and ANSI/ASTM C171-69(1969).

Acceptable Products: Or Approved Equal

Waterproof Paper

CIL [Plastics]	'0.15 mm(6 mil) polyethylene film'

Burlap-Polyethylene Sheet

.15 **Dampproof Membrane:** 0.152 mm (6 mil) black polyethylene sheet.

.16 **Vapour Barrier Film:** To CAN/CGSB 51.34-M86, Type 1.

Acceptable Products: Or Approved Equal

CIL [Plastics]	'0.15 mm(6 mil) polyethylene film'

.17 **Vapour Barrier Tapes:**

Acceptable Products: Or Approved Equal

Kendall	'Polyken No. 827'
3M	'Scotch Brand 483'

.18 **Steel Reinforcing Bars:** To applicable CSA-G30.12-M1977 series. Use deformed bars, unless noted otherwise on the drawings. Provide bar supports as required by Manual of Standard Practice of the Reinforcing Steel Institute of Ontario. For exposed concrete locations, use plastic, precast concrete or plastic protected steel supports. Fabricate reinforcing to CAN/CSA- A23.1-M90.

.19 **Welded Steel Wire Fabric:** To CSA-G30.12-M1977 for bars, CSA-G30.5-M1983 for welded steel wire mesh, 152 x 152 mm (6" x 6"), MW18.7/MW18.7 (6/6), and CSA-G30.15-M1983 for deformed steel wire mesh, chairs, bolsters, bar supports spacers, adequate for strength and support of reinforcing construction conditions.

.20 **Welded Deformed Steel Wire Fabric:** To CSA-G30.14-M1983 [for thin slab use].

.21 **Formwork:**

.1 Use new materials at start of work except where forms are required for rough unexposed concrete such as foundations when sound used materials may be substituted.

.2 **Plywood:** To CSA-O121-M1978 carrying COFI exterior stamp, Douglas fir, SIS with sealed edges.

.3 **Tubular Column Forms:** Round, spirally wound laminated fiber forms, internally treated with release material. Spiral of form must not show in hardened concrete surface.

.4 **Form Release Agent:** Chemically active release agents containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms.

Acceptable Products: Or Approved Equal
W.R. Meadows 'Sealtight-Duogard'

.3 **Ties for exposed concrete:** Threaded, internal snap-off disconnecting type fitted with plastic cones 25 mm (1") dia. x 50 mm (2") deep.

.4 **Plugs for holes left by disconnecting type ties:** PVC plastic with 6 mm ($^1/_4$") set back and of same colour as concrete.

.22 **Falsework:**

.1 Use new materials to CAN/CSA-S269.1-1975 at start of work except where forms are required for rough unexposed concrete such as foundations when sound used materials may be substituted.

.23 **Dovetail Channel Reglets:**

.1 Use new materials at start of work except where forms are required for rough unexposed concrete such as foundations when sound used materials may be substituted.

Acceptable Products: Or Approved Equal
Acrow-Richmond 'Dovetail Anchor Slot'

PART 3 - EXECUTION

3.1 **Rejected Work**

.1 Deliver only materials conforming to specified requirements. Remove immediately if rejected after delivery.

3.2 **Formwork and Falsework Construction**

.1 All formwork to comply to CAN/CSA-A23.1-M90.

.2 All falsework to comply to CAN/CSA-S269.1-1975.

.3 Construct formwork and falsework to obtain concrete surface specified.

.4 Make forms tight and flush faced to prevent mortar leakage, fins or panel outlines.

.5 Apply form coating and release agent to contact surface of formwork panels before first use and before each reuse. Seal lumber in forms for architectural concrete prior to use. Apply form coating uniformly to surfaces.

.6 Use internal form ties. Locate ties in a uniform pattern to the Architect's approval.

3.3 **Removal of Formwork**

.1 Be responsible for structural safety before placing, during placing and after approval of forms. Retain forms and supporting shores in place until members are self-supporting and superimposed construction loads may be applied without excessive deflection or distortion. Retain formwork, exclusive of shoring, until concrete attains 75% of the specified 28 day strength.

3.4 **Isolation/Expansion Joints**

.1 Install isolation (expansion) joints in new concrete at 9 m (30 ft) on centre in each direction, between walls/footings/columns/piers and slabs-on-grade and/or as shown on drawings. Cast joints in place. Sawcut joints are not acceptable.

.2 Install premoulded joint filler for each joint in single piece for depth and width required for joint, unless otherwise required by Architect. When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other method of positive fastening.

.3 Locate and form isolation joints as indicated. Install premoulded joint filler.

.4 Use 12mm ($^1/_2$") thick premoulded joint filler to separate slabs-on-grade from vertical surfaces and extended joint filler from bottom of slab to within 12mm ($^1/_2$") of finished slab surface unless otherwise noted.

3.5 **Control Joints** To Section 03350: Concrete Finishing.

3.6 **Waterstops**

.1 Install waterstops to provide a continuous water seal. Do not distort or pierce waterstop in such a way as to hamper performance. Do not displace

reinforcement when installing waterstops. Use equipment to manufacturer's requirements to field splice waterstops. Tie waterstops ridgidly in place.

.2 Use only straight heat sealed butt joints in the field. Field weld all corners and intersections.

3.7 **Epoxy Materials**

.1 Mix and apply epoxy materials for reinforcing in accordance with the manufacturers printed instructions.

.2 Brush or spray application is acceptable.

.3 Ensure pot life and tack free times at various temperatures is strictly observed. Mix and apply materials in quantities that can be applied within the specified pot life and follow by concreting while the epoxy is in the proper condition.

3.8 **Placement of Reinforcing**

.1 Store reinforcement on racks and skids to protect from dirt and to retain the fabricated form.

.2 Do not field bend reinforcing.

.3 Before placing, remove loose scale, dirt, oil or other coatings liable to impair bond. Place reinforcement within specified tolerances and secure in position with chairs, spacers and hangers.

.4 Fabricate, place and cover reinforcing steel to CAN/CSA-A23.1-M90, Section 12.

3.9 **Inserts**

.1 Set sleeves, ties, anchor bolts, pipe hangers, inserts, and form openings in concrete floors and walls, as required by other trades. Sleeves, openings, etc., greater than 100 x 100 mm (4" x 4") and not indicated on structural drawings require the Architect's approval.

.2 Ensure sleeves, ducts, pipes or openings do not pass through joists, beams, or columns; except where expressly detailed on structural drawings or as approved by the Architect.

.3 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain the Architect's approval of modifications before placing concrete.

.4 Check locations and sizes of sleeves, openings, etc., shown on structural drawings against architectural, mechanical and electrical drawings.

.5 Set inserts according to design drawing as required by non-destructive method for testing concrete.

.6 **Anchor Bolts:**

.1 Place anchor bolts to templates provided by trade supplying anchors prior to placing concrete.

.2 Grout anchor bolts in preformed holes or holes drilled after concrete has set. Formed holes to be at least 100mm (4") in diameter. Drilled holes to be at least 25% larger than diameter of bolts used.

.3 Protect anchor bolts from water accumulations.

.4 Set bolts and fill with approved shrinkage compensating grout.

.7 **Drainage and Weep Holes:**

.1 Form drainage and weep holes.

.2 Install all drainage and weep hole tubes as indicated.

.6 **Dovetail Anchor Slots:**

.1 Install continuous vertical anchor slots with dovetail channel reglets attached to forms where masonry abuts concrete wall or columns.

.2 Install continuous vertical anchor slots with dovetail channel reglets attached to forms at 800mm (2'-8") o.c. where concrete walls are masonry faced.

3.10 **Grouting**

.1 Grout under steel column and beam bearing plates with non-shrink grout to manufacturer's instructions which result in 100% contact over grouted area. Neatly trowel exposed grout edges.

3.11 **Dampproof Membrane/Vapour Barrier Installation**

.1 Install polyethylene film on top on compacted granular fill to underside of slab on grade.

.2 Lap joints 150 mm (6") minimum and seal with tape and acoustic sealant.

.3 Extend dampproof membrane/vapour barrier tight to perimeter of foundation walls and other components interrupting continuity of membrane/barrier, lap up membrane/barrier at edge of walls full thickness of slab, seal with tape and sealant.

3.12 **Proportioning Concrete**

.1 To CAN/CSA-A23.1-M90, Section 14, Alternative 1 Table 11. Design mixes to produce concrete properties designated.

.2 Concrete surfaces subject to foot traffic only; minimum cement content 320 kg/m^3.

.3 Concrete surfaces subject to vehicular traffic; minimum cement content 360 kg/m^3.

.4 Exterior concrete surfaces subject to de-icing and chemical materials: Class A exposure.

.1 Maximum water/cement ratio: 0.45.

.2 Maximum slump at point of discharge: 75 mm ±25 mm (3" ±1").

.3 Maximum nominal aggregate size: 20 mm ($^3/_4$").

.4 Minimum compressive strength: 30 MPa.

.5 Minimum compressive strength for delamination repairs: 30 MPa.

.6 Range in total air content:

.1 7 percent to 10 percent for concrete with 10 mm ($^3/_8$") maximum aggregate

.2 5 percent to 8 percent for concrete with 19 mm ($^3/_4$") maximum aggregate

.5 Use water reducing agent and air entraining agent as directed. If other admixtures are required to produce specific properties, obtain the Architect's written approval before using. Do not use calcium chloride or other admixtures containing chloride.

3.13 **Production of Concrete**

.1 Use mixed in transit concrete wherever possible.

3.14 **Concrete Placement**

.1 Thoroughly clean forms before placing concrete.

.2 Cast slabs with top surface level or sloped for drainage as indicated.

.3 Prior to placing concrete, obtain the Architect's approval of form work, placement of reinforcing steel, consolidation of subgrade, placement and consolidation of granular base and finished grades. Notify Architect 24 hours before placing concrete.

.4 Do not pump concrete, unless obtaining approval of equipment and mix.

.5 Convey concrete from mixer to place of deposit so as to prevent separation or loss of materials. Maximum time for the operation is 60 minutes. Deposit concrete as close as possible to the final position. Once started, placing must proceed as a continuous operation until the full section is complete.

.6 Place concrete in the final position ensuring that it remains plastic, flows readily between reinforcement, fills forms and surrounds embedded fixtures.

.7 Place in a continuous operation between expansion joints. Clean equipment used for mixing or transporting concrete prior to use. Avoid contamination of concrete with foreign materials.

.8 Consolidate concrete using vibrators or by other approved methods during placing operations. Do not operate a vibrator for longer than 10 seconds in any one location. Work around reinforcement, embedded items, into corners and eliminate air and stone pockets. Ensure that an adequate number of workers are available for this operation.

.9 Ensure finished concrete is dense, uniform, free of air holes or honeycombs and that no segregation of aggregate and cement paste occurs.

.10 Ensure reinforcement and inserts are not distured during placement of concrete.

.11 In locations where new concrete is dowelled to existing work, drill holes in existing work. Place steel dowels of deformed steel reinforcing bars and pack solidly with shrinkage compensating grout to positively position and anchor dowels.

.12 For slab-on-grade pour concrete, and work into mesh and around reinforcing. Lift reinforcing as required to ensure proper location.

.13 Accurately form all openings in concrete required by Division 15: Mechanical and Division 16: Electrical. Refer to those Divisions and the Mechanical and Electrical drawings for sizes and locations. Confirm with those trades the specific methods of forming. If required make allowance in size of openings for future insulation of items.

3.15 **Finishing** To Section 03350: Concrete Finishing

3.16 **Curing** To Section 03350: Concrete Finishing.

3.17 **Surface Patching** To Section 03350: Concrete Finishing.

3.18 **Clean-up**

.1 Daily: scrape up and remove concrete droppings and debris.

.2 At completion: remove formwork, accessories, equipment and debris. Leave premises in a 'broom-clean' condition.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for all concrete finishing as shown on the drawings, described herein, or as necessary to complete the work.

1.2 Related Works Under Other Sections:

.1 Section 03300: Cast-in-Place, [provide concrete finishing]

1.3 Standards

.1 Comply with requirements of Ontario Building Code, Ontario Occupational Health and Safety Act and municipal building By-laws and Regulations.

.2 Except where modified by the drawings, conform to the following:

STANDARD	TITLE
ACI 301	Tolerances of Concrete Construction.
CAN/CSA-A5-M88	Portland Cements.

1.4 Qualifications

.1 Work under this section to be carried out by a company with minimum (5) years experience on projects of similar size and character and must be a member of the Concrete Finishing Contractors Association of Canada.

1.5 Examination

.1 Examine all surfaces and conditions upon which the work of this section depends. Report all discrepancies to the Architect.

1.6 Co-ordination and Co-operation

.1 Co-operate with other trades on concrete related work. Give other trades all information regarding materials or items supplied by this trade and affecting work of other trades.

.2 Examine all drawings, showing work of other trades on which this work is in any way dependent, and report to the Architect any errors or discrepancies affecting this work.

1.7 Special Protection

.1 Protect work of other sections while work of this section is being performed.

.2 Do not pile or store materials on slabs, nor wheel or handle materials thereover until design strength of concrete is verified.

.3 Protect finished floors as soon as possible against damage by traffic and other trades.

PART 2 - PRODUCTS

2.1 Materials

.1 **Portland cement:** To CAN/CSA-A5-M88, Type 10, Normal.

.2 **Fine aggregate:** To CAN/CSA-A23.1-M90, graded within to following limits.

.1 100% by weight passing a 10 mm ($^3/_8$") sieve.

.2 90% by weight passing a #4 sieve and not more that 8 - 30% by weight passing a No. 50 sieve.

.3 **Mixing water:** To CAN/CSA-A23.1-M90.

.4 **Saw Cut Control Joint Sealant:** Two component epoxy urethane, catalyst cured self-leveling sealant. Prime damp joints with recommended primer.

Acceptable Products: Or Approved Equal

Grace	'Daraweld-C'
Master Builders	'Embeco Mortar'
W. R. Meadows	'Bonoflex'
Sternson	'Loadflex'

.5 **Interior Curing Compounds:** Clear liquid chlorinated rubber to ASTM C309-89, Type 1. No darkening or discolouration of concrete surfaces acceptable; compatible with, and not impairing bond of, superimposed material.

Acceptable Products: Or Approved Equal

Conchem	'Triple Seal'
CPD Services	'Cure and Seal'
Master Builders	'Master-Kure CR' [clear]
Sternson	'Florseal' (exceeds ASTRA C-309)
Meadows	'CR-26'
CC Chemicals	'Acrylic curing compound'

.6 **Special Sealing Compounds:** Clear liquid concrete surface hardware as indicated drawings and/or specified within.

Acceptable Products: Or Approved Equal

W.R. Meadows	'Curehard'
Sternson	'Sealhard 400'

.7 **Resurfacing Bonding Agents:** Latex emulsion for use as a bonding agent for patch and crack repairs to concrete slab.

Acceptable Products: Or Approved Equal

W. R. Meadows	'Sealtight - Bodlok'
Sternson	'Surfacrete Concentrate'

.8 **Grout Mixes:**

.1 Patching and Crack Filler [for repairs] to same colour, texture, strength and finish as adjacent surfaces.

1 part portland cement
2 parts fine concrete sand
recommended latex water additive.

.9 **Curing Membrane:** To ANSI/ASTM C171-69(1969), CAN/CGSB 51.34-M86, Type 1 .

Acceptable Products: Or Approved Equal
Waterproof paper
CIL [Plastics] '0.15 mm(6 mil) polyethylene film'
Polyethylene coated burlap

PART 3 - EXECUTION

3.1 Finishing Interior Concrete Slabs

.1 Conform to CAN/CSA-A23.1-M90, and applicable specifications of the Concrete Floor Contractors Association. Co-ordinate with Section 03300: Cast-in-Place Concrete for finishing of interior concrete floor slabs.

.2 After rough levelling of monolithically placed concrete floors, fine grade concrete to screed lines using straight edge, strike off, darbys, mechanical floats, trowels before free moisture (bleeding) rises to the surface. Finish, supply and apply all specified curing compound and hardness where indicated on drawings and/or specified herein.

.3 This section to be responsible for control and supervision of placing and finishing of the work.

.4 Screed concrete to correct elevations, slopes, and recesses, etc. as shown on drawings.

.5 Complete all required edging prior to floating. Ensure all coarse aggregates are covered and that edger does not leave too deep an impression in top of slab. Do not use edging tool at control joints.

.6 Darby or bull float surface, smoothing and leveling, concrete. Allow bleed water and sheen to disappear.

.7 Float surface with steel trowel to a smooth even finish, when concrete has hardened enough for a man to leave only slight foot prints on surface.

.8 Do not bring water and fines to surface by over floating. Where longer floating is required, repeat floating operation after sheen has disappeared and concrete has further hardened.

.9 Unless otherwise specified do not apply water to the concrete surface to assist in finishing operations.

.10 Apply hardener/sealing/curing compounds where specified and to manufacturer's printed directions.

.11 Where floor drains occur, floor shall be level around walls and have minimum 6 mm per 300 mm ($^1/_4$" per foot) uniform pitch to drains, unless indicated otherwise.

.12 Finish floors to a hard, dense, level surface free from pinholes, imperfections and trowel marks.

3.2 Curing Interior Concrete

.1 Cure concrete surfaces not in contact with forms by applying curing-sealing compound according to manufacturers printed instructions immediately after disappearance of surface water sheen. The applied material must not discolour surfaces and be compatible with and not impair level of any material laid on the surface.

.2 Immediately after placing, protect concrete from premature drying, sunshine exposure, excessively hot or cold temperature during proper hydration of cement in the concrete. Keep moisture loss to a minimum.

3.3 Isolation Joints

.1 **Interior Concrete:** To Section 03300: Cast-in-Place Concrete.

3.4 Control Joints

.1 Provide all sawcut and/or tooled control joints as indicated on drawing and/or specified herein.

.2 Continue reinforcing uninterrupted through joints at 3 m (10 ft) on centre in each direction and or as shown on drawings.

.3 Commence sawing as soon as concrete has hardened sufficiently to prevent excessive ravelling. Ensure that saw does not touch or disturb reinforcing steel. Sawcuts shall not vary more than 12 mm ($^1/_2$") from true joint alignment. Power saw cut 6 x 12 mm ($^1/_4$" x $^1/_2$") deep control joints directly along centre line of construction joints in floor slabs-on-grade. Power saw cut control joints of from 3 m ($^1/_8$") to 5 mm ($^3/_{16}$") wide x depth equivalent to from $^1/_4$ to $^1/_3$ slab thickness, but no less than 32 mm ($1^1/_4$") deep in slabs-on-grade. Clean joints after cutting. Fill to within 6 mm ($^1/_2$") of surface with dry silica sand. Fill remaining voids of following exposed joints with saw cut joint sealant;

.1 Joints in floor surfaces to remain exposed.

.2 Joints in floor surfaces to receive thin film type coatings.

3.5 Crack and Patch Repair

.1 Repair with specified products to satisfaction of Architect.

3.6 **Clean-up**

.1 Daily: scrape up and remove concrete droppings and debris.

.2 At completion: remove formwork, accessories, equipment and debris. Leave premises in a 'broom-clean' condition.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for installation of unit masonry, reinforcing and other components as shown on the drawings, described herein, or as necessary to complete the work.

1.2 Related Work Under Other Sections

None

1.3 Applicable Codes and Standards

.1 Technical Builders Bulletins, Section 20 'Above Grade Masonry'.
.2 Ontario Building Code 'Plain and Reinforced Masonry'.
.3 CAN3-S304-M84 'Masonry Design for Buildings'.
.4 CAN3-A370-M84 'Connectors for Masonry'.
.5 CAN3-A371-M84 'Masonry Construction for Buildings'.
.6 CAN/CSA-A405-M87 and Brick Institute of Americas Standards "Design and Construction of Masonry Chimneys and Fireplaces"

.7 ULC fire-rated assemblage requirements.

1.4 Co-ordination and Co-operation:

.1 Co-ordinate and co-operate with all other trades to ensure satisfactory and expeditious completion of the work.

1.5 Inspections and Tests

.1 Inspect previously prepared bearing surfaces. Reject unsatisfactory surfaces upon which masonry depends. Commencement of work implies acceptance of the bearing surface.

.2 If suppliers or manufacturers cannot provide an acceptable recent independent test report [i.e. within the last three [3] years] attesting to the materials specification, obtain and pay for the required tests.

.3 The Architect shall be the sole judge as to acceptability of work. If any work is rejected, promptly remove from site and replace with proper materials and workmanship as required. Pay for any tests required to determine cause of failures.

1.6 Delivery Storage and Handling

.1 Handle and store mortar materials to CAN3-S304-M84 in a dry state with manufacturer’s seals and labels intact.

.2 Stack units, strapped to delivery pallets, clear of ground and under clean and dry weathertight cover.

1.7 Protection

.1 Protect stored materials against damage. Remove rejected or damaged materials from site.

.2 Protect surrounding surfaces and work of others. Install temporary protective covers, nosings, etc. Remove before final inspection.

.3 During construction and until completed and protected by flashings or caps, keep masonry work, particularly cavities, dry by using waterproof, non-staining coverings extending over and down side surfaces to protect walls and mortar cure from wind-driven rain. Maintain wall cavities free of mortar droppings to prevent bridging and to ensure drainage. Leave temporary clean out openings at base of cavity and afterwards reinstate when mortar cleaned.

.4 Protect completed work from marking or other damage, particularly from overhead mortar droppings.

.5 Provide temporary protection to interior of building existing weatherproof surface disturbed prior to installing new masonry.

.6 Provide adequate temporary bracing of new and existing masonry work during construction until permanent lateral support in place.

PART 2 - PRODUCTS

2.1 Materials

.1 **Mortars:**

.1 **Cement** - CAN/CSA-A5-M88 - 'Portland Cement'.

.2 **Cement -** CAN/CSA-A8-M88 - 'Masonry Cement'

.3 **Sand** - CSA -A82.56-M1976 - 'Aggregate for Masonry Mortar'.

.4 **Water** - Drinking quality.

.5 **Lime -** Hydrated Lime to ASTM C207 and ASTM C5

.6 **Lime Putty -** Soak Hydrated Lime not less than 12h in water.

.7 **Plasticizer:** (for structural purposes)

Acceptable Products: Or Approved Equal

Master Builders 'Omicron'
Sternson 'Sterad 300'

.8 **Mortar Colours** - Non-fading, non-staining, lime-proof metallic oxide pigments.

Acceptable Manufacturers: Or Approved Equal

Northern Pigment

.2 **Mortar Mixes:**

.1 **Non-staining Mortar [for above grade-grey]**
Type 'S': to CSA -A179-M1976 [12.5 MPa]
1 part cement
$^{1}/_{2}$ part lime putty
4-$^{1}/_{2}$ parts sand
Plasticizer to manufacturers directions

.2 **Pointing Mortar [for repairs]:**
1 part cement
$^{1}/_{8}$ part lime putty
3 parts sand [carefully selected to match existing colour]

.3 **Non-shrink Grout [for inserts, bearing plates, etc.]:** Pre- mixed, minimum strength 4 MPa at 28 days.

Acceptable Products: Or Approved Equal

C.C. Chemicals	'In Pakt'
CPD Services	'Non-shrink Grout'
Master Builders	'Masterflow 713'
Sternson	'Ferrogrout'
Meadows	'U-3'

.3 **Handling Mortar:** Prepare only sufficient mortar usable within one hour of mixing. Wash out mixing box, transport boards, mixing and handling tools between each load. Add only enough water to maintain mix at a stiff workable consistency.

.4 **Masonry Reinforcement, Ties and Concrete Block Ties:**

.1 **Single Wythe Concrete Block Reinforcement:** To CAN3-A370 and A371-M84; hot dipped galvanized ladder type 4.76 mm ($^{3}/_{16}$") side rods and 4.76 mm ($^{3}/_{16}$") cross rods, with preformed corner pieces.

Acceptable Products: Or Approved Equal

Blok-Lok	'Blok-Lok BL30 Extra Heavy Duty'
Dur-O-Wal	'Ladur DW200 Extra Heavy Duty'

.2 **Composite Brick Concrete Block Reinforcement:** To CAN3- A370 and A371-M84,:hot dipped galvanized truss type 4.76 mm ($^{3}/_{16}$") side rods and 4.76 mm ($^{3}/_{16}$") cross rods, with preformed corner pieces.'

Acceptable Products: Or Approved Equal

Blok-Lok	'4 wire Blok-Trus BL32 Extra Heavy Duty'
Dur-O-Wall	'Truss Double DW120 Extra Heavy Duty'

.5 **Concrete Block:**

.1 To CAN3-A165.1-M85 with units to match existing including all specialty shapes, from one manufacturer; uniform in colour, shade and texture; test-rated at:

.1 **S/15.0/A:** 75 percent solid for exposed interior block walls.

.2 Provide test reports attesting to the requirements of the specified material.

Acceptable Products: Or Approved Equal

Day and Campbell 'Ty-lon (Limestone Finish)'

.6 **Face Brick:**

.1 To CAN/CSA-A82.1-M87, Grade SW, Type FBS maximum water absorbtion of 8 percent in 24 hour cold water submersion test and complying with the freeze-thaw test in CAN3-A82.2-M78. Provide a recent or new test report altesting to these requirements. To match existing size, colour, type and texture.

.7 **Weep Hole Vents:** Purpose-made plastic or galvanized steel, designed to drain cavities to exterior by means of a 10 mm ($^3/_8$") sloped tube, spaced horizontally at 600 mm oc (2 ft) in vertical joints at bottom of cavities [i.e. at bearing courses, at shelf angles, and at lintels].

Acceptable Products: Or Approved Equal

Dur-O-Wall 'Weep Holes'
Goodco'Goodco 'Vents'

Guenette 'No. 20'

.8 **Sheet Membrane Flashing:** 1.5 mm thick, self stick membrane .

Acceptable Products: Or Approved Equal

Henry/Bakor 'Blue Skin TWF'

PART 3 - EXECUTION

3.1 Preliminary Work

.1 Give at least [5] days notice to the Architect before starting work.

3.2 General

.1 Do all work in accordance with CAN3-A371-M84, Masonry Construction for Buildings and CAN/CSA-A405-M87 (see #6 in 1.3).

.2 Use lightweight concrete blocks for exposed interior surfaces of walls or partitions. Regular weight blocks may be used for concealed surfaces. Lay and point exposed masonry with extreme care as to evenly distribute masonry units to prevent patches and streaks and to produce a homogeneous surface for painted finish.

3.3 **Co-ordination**

.1 Co-ordinate masonry work with work of other trades. Obtain and build in fittings supplied by others. Instruct masonry trade to fit work of others, as required.

.2 Distribute units of varying colours and/or textures throughout the wall surface to avoid spottiness in finished surface. Do not use units with colours or textures excessively contrasting with the overall range. Reject chipped, blemished, cracked or defective units.

3.4 **Grades, Lines and Levels**

.1 Ensure grades, lines and levels are accurate, plumb, square and true to line.

3.5 **Coursing**

.1 Match existing coursing pattern.

.2 Erect masonry with level, accurately spaced courses.

.3 Align coursing horizontally and vertically.

.4 Take particular care at corners and reveals.

.5 Construct masonry evenly in maximum lifts of 1.5 m (5 ft) per day.

3.6 **Tolerances** To CAN3-A371-M84, Clause 5.3.1:

.1 **Plumb:** Maximum tolerance of 6 mm in 3 m ($^1/_4$" in 10 ft).

.2 **Level:** Maximum tolerance of 6 mm in 6 m ($^1/_4$" in 20 ft).

.3 **Line:** Maximum tolerance of 6 mm in 6 m ($^1/_4$" in 20 ft).

3.7 **Cutting**

.1 Lay out masonry work to ensure a minimum of cut units.

.2 Where necessary cut units with approved masonry saw.

.3 Make cuts straight, square and free from chips or breaks.

.4 Reject cuts with fractures on face edge.

.5 Do not install cut units at corners or reveals.

3.8 **Beds**

.1 Place units on full mortar beds.

.2 Butter ends of units for full vertical joints.

.3 Partially filled beds or partially filled vertical joints are not acceptable.

.4 At end of each days work, securely cover exposed and curing work.

.5 Concrete masonry units to have face shells and their end joints fully filled with mortar, and joints squeezed tight together. Fill webs at cores; to be reinforced

and grouted and strike flush at core taking care to prevent mortar from falling into core.

3.9 **Joints**

.1 As the work proceeds, wipe surface with a rough cloth to remove unsightly mortar stains.

.2 Unless otherwise specified, when mortar is 'thumb-print' hard, tool joints evenly, concave, smooth and straight where exposed to view, strike flush elsewhere or where indicated on drawings or specified herein. Press mortar tight against masonry units on both sides of joints. Remove excess material or burrs left after jointing. Use trowel or rub with burlap bag.

.3 Ensure vertical joints form smoothly into horizontal joints, all uniformly concave approximately 10 mm ($^3/_8$") high.

.4 Throwing mortar droppings into joints, deep or excessive furrowing of bed joints, using mortar that has taken initial set is strictly prohibited. Where adjustment must be made after mortar has started to set, remove mortar and replace with fresh supply.

3.10 **Lintels, Sleeves, etc.**

.1 Accurately build in lintels, sleeves, ties, frames, plugs, hangers, anchors, plates and other fitments.

3.11 **Expansion Joints**

.1 As shown on the drawings and as required by CAN3-S304-M84 and OBC.

.2 Accurately construct weather barred reveals with vertical joints plumb and true and as detailed on drawings.

.3 Build horizontal expansion joints to proper clearances.

3.12 **Control Joints**

.1 As required by CAN3-S304-M84 and OBC: material to suit size and shape of joint as detailed on drawings.

.2 Construct joints in a toothed staggered pattern as detailed on drawings.

.3 As wall is being constructed place soft control joint backer pad into joint (see 2.6) in the longest continuous available lengths.

.4 Clear mortar from joint and prepare for sealing with specified control joint back up rod (see 2.7).

3.13 **On Completion**

.1 After mortar has cured and if staining has occurred, wash down surfaces as follows. Protect other work during washdown operations.

.1 **For Concrete Block, Brick and Concrete Faces:** Wet surface with clear water. Scrub in a zinc sulphate solution [i.e. zinc sulphate 200 g. to 1 L water] and remove stains with a fibre brush. Thoroughly flush with clean water.

3.14 **Clean-up**

.1 Carefully rub down finish surfaces and remove stains using a rough cloth and/or fibre brushes. Remove mortar droppings, debris and broken or chipped units.

3.15 **Maintenance**

.1 Replace or repair any work damaged during construction or warranty period, including removing and neutralizing efflorescence.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for the installation of structural steel framing, anchors, support angles, brackets, loose lintels, etc., as shown on the drawings, described herein or as necessary to complete the work.

1.2 Related Work Under Other Sections

None

1.3 Applicable Codes and Standards

.1 Comply with requirements of Ontario Building Code, Ontario Occupational Health and Safety Act and municipal building By-laws and Regulations.

.2 **Structural steel and joists:** To CAN/CSA-G40.21-M87, as listed in CISC Handbook, 'Code of Standard Practice of Steel Construction'.

.3 **Connections, details and bolting:** To CAN/CSA-S16.1-M89.

.4 **Welding:** To CSA-W59-M1989

.5 **Welders:** Approved by the Canadian Welding Bureau under CSA-W47.1-1983.

1.4 Co-ordination and Co-operation:

.1 Co-ordinate and co-operate with all other trades to ensure satisfactory and expeditious completion of the work.

.2 Provide all necessary anchors, templates, sleeves, inserts and accessories required to be fixed to or inserted in the work of other sections and set in place. Inform related sections as to their locations.

1.5 Examination

.1 Examine all surfaces and conditions upon which the work of this section depends. Report all discrepancies to the Architect.

1.6 Delivery, Storage and Handling:

.1 Deliver and store materials undamaged in dry area, stacked to allow free air circulation.

.2 Deliver items to site in the largest practical sections and tag or mark (chalk only) items for identification.

.3 Replace all items received in damaged condition and/or as deemed to be defective by the Architect.

1.7 Shop Drawings

.1 Submit [4] copies of shop drawings, schedules and erection diagrams, clearly showing:

.1 The signed stamp of a professional structural engineer registered in Ontario.

.2 Shop details, cuts, bracing, copes, moment connections, connections, holes, threaded fasteners, rivets and welds. Indicate welds using welding symbols to CSA-W59-M1989. Show type, size, spacing, doubled units, bridging, plates, anchors, anchor bolts, and other fitments.

.3 Erection details, methods, sequence of erection and type of erection equipment and to show correlated erection marks.

.4 Indicate all hot dipped galvanizing.

.5 Requirements by all authorities having jurisdiction, submit calculations and such further proof required to conform to the regulations, codes and by-laws.

PART 2 - PRODUCTS

2.1 Materials

.1 **Structural Steel:** To CAN/CSA-G40.21-M87. Grade 300W for rolled shapes and plates. Grade 350W for hollow structural sections. Steel pipe columns to ASTM A53-77a, Type E or S Grade B, schedule 40 and 80.

.2 **Connectors:**

.1 **Bolts, nuts, and washers:** To ASTM A325-M78.

.2 **Rivets:** To CAN/CSA -G40.21-M87.

.3 **Weld materials:** To CSA -W59-M1989.

.4 **Weld Electrodes:** To CSA-W48.1-M1980.

.5 **Anchor Bolts:** To ASTM A307.

.3 **Primer:**

.1 **General Primer:** To CAN/CGSB-1.40-M89 'Primer, Structural Steel, Oil Alkyd Type.'(*for interior steel surfaces*) and/or to CAN/CGSB-1.140-M89 'Oil Alkyd type Red Lead, Iron Oxide Primer' (*exterior steel surfaces*).

.2 **Zinc Rich Primer (hot dipped galvanized touch-up work and work specified):** To CAN/CGSB-1-GP-181M 'Coating, Zinc Rich, Organic, Ready Mixed'.

.4 **Non-Shrink Grout**: Pre-mixed compound; non-metallic aggregate to Section 04211 Paragraph 2.2.6.

Acceptable Products: Or Approved Equal

CC Chemicals	'In-Pakt'
Conchem	'Super Grout 1000'
CPD Services	'Non-Shrink Construction Grout'
Master Builders	'Masterflow 713'
Meadows	'V-3 Pre-Mixed'
Sternson	'M-Bed Standard'
Webster	'Tartan No-Iron'

2.2 **Design Criteria**

.1 All components to be designed in accordance with CAN/CSA-S16.1-M89 and to design loads indicated on drawings.

.2 Use high strength bolts for structural connections between members which are subject to stress reversal or which carry horizontal or axial forces to their supporting columns or beams (friction type connection), unless otherwise shown on drawings.

.3 Welding maybe used to attach connection angles to beam webs, unless otherwise indicated.

2.3 **Fabrication**

.1 Fabricate structural steel to CAN/CSA-S16.1-M89, and to reviewed shop drawings, with Structural Engineers seal and to field dimensions.

.2 Provide loose lintels, wall plates, bearing plates and anchors to relate to other sections as required.

.3 Provide punched hole connectors and anchors as required for attachment to other work.

.4 Reinforce openings in members to maintain full design strength.

.5 Connections shall be bolted or shop welded or field welded.

.6 Fabricate work complete with components required for anchoring, bolting or welding to structure; standing free or resting in frames by welding.

.7 Fabricate items in largest possible sections. Form joints in field by welding.

.8 Fabricate work true to dimensions, square, plumb and level. Joints and intersecting members shall be securely fitted with adequate fastenings. Make finished work with true places set to receive related work of other sections and/or subsequent work of this section.

.9 Fabricate, fit and assemble work in shop where possible.

.10 Fill or Grind exposed welds, smooth and flush. Fill all grind marks and other imperfections ready for prime painting. Finish work free of weld splatter.

.11 Fill open joints, depressions and seams with metallic paste filler or by continuous brazing or welding and grind smooth to true, sharp arises and profiles.

.12 Beam connections shall be adequate to resist the reactions produced by the framing and/or load connections.

.13 Mill bearing plates unless plate is sufficiently flat to give contact bearing between surfaces.

.14 Fabricate structural steelwork which will be architecturally exposed to ensure uniform surfaces and neat joints. Continuously seal as weld connections exposed to exterior conditions. Grind smooth all trade manes and identification marks.

2.4 **Finishing**

.1 **Primed Finish:**

.1 After fabrication thoroughly clean, scrape and remove rust, mill scale, grease and other extraneous material. Solvent clean to SSPC-SP1-63.

.2 Apply full smooth coat of primer, work primer into corners and open spaces such that all visible and accessible surfaces are fully covered.

.3 Deliver all items to site with primed surfaces undamaged to satisfaction of the Architect.

.4 Do not prime surfaces and edges to be field welded, and friction type connections.

PART 3 - EXECUTION

3.1 **Preliminary Work**

.1 Give at least [5] days notice to the Architect before starting work.

3.2 **Erection**

.1 Erect, connect and secure members to CAN/CSA-S16.1-M89 and in accordance with reviewed shop drawings and O.B.C.

.2 Provide all necessary temporary supports and bracings.

.3 Pay for all hoisting and lifting of steel members.

.4 Do drilling, cutting and fitting necessary to attach work to adjoining components and surfaces and make it complete.

.5 Use bituminous point, butyl tape or other suitable and approved means, to prevent electrolytic action between, dissimilar metals, metal and concrete or masonry.

.6 Do not oil, soak in oil, grease or lubricate in anyway; high strength bolts, nuts and washers prior to use.

.7 Erect individual members to a tolerance of 1:500.

3.3 Field Changes

.1 Obtain Structural Engineers written permission prior to field cutting or alteration of any member, connector, or altering a detail.

3.4 Completion

.1 Touch up with primer over field-installed items, such as bolts, rivets, welds, burned, scratched or abraded surfaces to Primer sections 2.1.3 and 2.5 above.

.2 Immediately after erection, remove loose scale, rust, oil, dirt, etc., from exposed steel, grind smooth all welds and apply a full bodied coat of primer to same or heavier thickness than shop primer.

.3 Do not remove erection equipment from site until installation has been inspected and accepted in writing by the Structural Engineer.

.4 Remove or conceal trade marks or disfiguring marks on exposed steel surfaces.

3.5 Clean-up

.1 Remove tools, equipment, trash, debris and waste materials from site. Leave 'broom-clean'.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for the installation of rough carpentry shown on the drawings, described herein or as necessary to complete the work.

1.2 Related Work Under Other Sections:

None

1.3 Applicable Codes and Standards

.1 Comply with requirements of Ontario Building Code, Ontario Occupational Health and Safety Act and municipal building By-laws and Regulations.

.2 **Lumber:** Identifiable by the NLGA grade stamp of an agency certified by The Canadian Lumber Standards Accreditation Board.

.3 **Pressure treated wood:** To CAN/CSA -O80 Series-M89. Identifiable by the ULC classification label.

.4 **Lumber fastenings:** To OBC Section 4.3.1 and Part 9.

1.4 Delivery, Storage and Handling

.1 Delivery all materials as specified any defective, damaged, warped material or material deemed to be inferior to the specification by the Architect will be promptly replaced.

.2 All materials shall be storaged and stacked in order to prevent damage from exposure to moisture.

1.5 Samples

.1 Provide 300 mm (12") long sample pieces of all pressure preserved wood components to be exposed to view. The samples will be reviewed by the Architect for colour and quality, the samples will be adjusted until the Architect is satisfied. The accepted samples will serve as a standard for all other work.

1.6 Co-ordination and Co-operation:

.1 Co-ordinate and co-operate with all other trades to ensure satisfactory and expeditious completion of the work.

.2 Provide and install all necessary components specified under this section, required to be fixed to or inset in the work of other sections. Inform related sections as to their locations.

PART 2 - PRODUCTS

2.1 Materials

.1 **Lumber Materials:**

.1 **Lumber:** [Eastern White Spruce], [Eastern Red Pine] [Douglas Fir] [grade stamped] softwood S4S, kiln dried to maximum 19 percent

moisture content, to CAN/CSA-O141-1970 and NLGA Standard Grading Rules for Canadian Lumber [1984], unless shown otherwise.

.2 Lumber for each type of structural component; of same species and grade.

.3 Use machine stress-rated lumber wherever possible to CAN/CSA-O86-M84, Table 53; do not use glued end or finger-jointed lumber for framing.

.4 **Lumber:** To OBC Subsection 9.3.2 and as follows:

LUMBER	**MINIMUM GRADE**
Framing [Studs, joists, beams, columns]	Structural No. 1
Board [Floor, wall, roof supports]	Standard No. 2
Backing [Furring, blocking, grounds, bucks]	Standard No. 2
Roof [Cants, curbs, nailers, sleepers, pressure treated]	Standard No. 2

.2 **Plywood Blocking:** Exterior grade Douglas Fir Plywood, To CSA-O121- M1978, sheathing grade.

.3 **Building Paper:** To CAN/CGSB 51.32-M77 laminated type.

.4 **Vapor Barrier:** Polyethylene Film; to CAN/CGSB-51.34-M86, Type 2, 6 mil thick.

.5 **Adhesive:** To CAN/CGSB-71.26-M88, cartridge loaded.

.6 **Fastenings and Hardware:**

.1 Spiral or annular grooved nails, spiral spikes or heavy duty staples; to OBC Subsection 9.23.3.

.2 For exterior applications, interior high-humidity areas and in preservative treated applications; hot dip, galvanized fastenings to CAN/CSA-G164-M1981.

.3 For other sight-exposed fasteners and hardware; primer paint coating to CAN/CGSB-1-GP-181M.

.4 **Specialty hardware types:**

.1 **To hollow masonry and gypsum board walls:** Toggle type bolts.

.2 **To solid masonry and concrete surfaces:** Expansion shield with lag screw, or lead plug with wood screw.

.3 **To structural steel:** Bolts through drilled holes,
OR
.3 **To structural steel:** Welded stud bolts,
OR
.3 **To structural steel:** Power driven, self-tapping screws.

.5 **Screws:** To be stainless steel and/or brass with flat countersunk heads, of length and size to ensure positive fastening or as noted on drawings.

.6 **Expansion Shields:** Lead shield type.

.7 **Surface-applied Wood Preservatives (for exposed cut surfaces):** To be copper naphthenate solutions containing a minimum of 2% copper. Use all manufacturers precautions in using the products.

.1 **For exterior paint, stained or natural finishes on air exposed lumber:** To manufacturers recommendations.

Acceptable Products:

Hickson	'Wolman (Cedar tone)'

.2 **For interior and/or exterior concealed or covered lumber as specified:** To manufacturers recommendations.

Acceptable Products:

Osmose	'Pentox Green'
Solignum	'1-4-2, 1.35'

.8 **Pressure Preservatives:** To CAN/CSA-O80 P5 Series-M89, water-borne preservatives vacuum pressure impregnated and CAN/CSA-O80 Series-M89 in general.

.1 Lumber used for structural decking, beams, purlins, braces, columns, fascias, trim, blocking, timbers etc. To CAN/CSA-O80.1, .2, .5, .9 Series M-89. To an average net retention of 6.4 kg/m^3 (0.040 pcf).

Acceptable Products:

Hickson	'Cedar Tone Plus'

.2 For all concealed exterior lumber (other than items specified under 2.1.8). Lumber used for roof cants, curbs, nailers, sleepers, sheathing, plywood decking, and interior lumber in contact with concrete block or poured concrete surfaces. To CAN/CSA-O80.1, .2, .5, .9 Series M-89 water borne preservative chromated copper arsenate (CCA) to an average net retention of 6.4 kg/m^3 (0.40pcf).

PART 3 - EXECUTION

3.1 Preliminary Work

.1 Give at least [5] days notice to the Architect before starting work.

.2 Drill all holes in steel members required unless steel members have been predrilled.

3.2 **Framing**

.1 Comply with OBC, Section 9.23.

3.3 **Erection**

.1 Install members plumb, true to line, levels and elevations and uniformly spaced.

.2 Form continuous members from pieces of longest practical length.

.3 Install spanning member with 'crown-edge' up.

.4 Do not use material which is warped, split, checked, twisted, or cupped unless otherwise directed.

.5 Fabrication and installation methods to allow for expansion and contraction of the specified materials.

.6 Install all rough hardware including nails, screws, bolts, washers, brackets, hangers, and fastening devices of all types.

.7 Fasten to hollow units and drywall with toggle bolts; to solid masonry or concrete with lead expansion shields and lag screws; and to structural steel with bolts through drilled holes, or welded stud-bolts or power driven self-drilling screws. Do NOT use organic fibre or wood plugs.

.8 Cast in anchors or inserts as specified, or drill concrete and use expansion shields and bolts.

.9 Set or countersink all fastening devices flush with surface of framing members. all fastenings shall be drawn up tight. Countersink bolts where necessary to provide clearance for other work. Use 10 mm ($^3/_8$") bolts for 50 mm (2") nominal bucks and blocking. Locate fasteners within 300 mm (12") of ends and uniformly spaced between. Space bolts at 800 mm (2'-8") oc.

3.4 **Appearance Grade Materials**

.1 Install lumber and panel members and finish with translucent or transparent stain type coatings with grade-marks, labels and other defacements concealed. Do not surface cut or sand to remove these marks.

3.5 **Furring and Blocking**

.1 Install furring and blocking accurately located and secured to provide support bases for surface-applied fitments [e.g. cabinets, plumbing fixtures, accessories, electrical fitments, etc.].

.2 Align and plumb faces of furring and blocking to a tolerance of 1:600.

.3 Install miscellaneous wood members. Do not regard furring, blocking or strapping indicated as exact or complete. Locate and secure these pieces to suit site conditions. Provide adequate fastenings and support required for attaching work of other sections.

.4 Fasten wood to masonry where required using approved nails.

.5 Install all wood blocking and plywood back-up required. Shape as necessary, and securely fix to steel where indicated.

.6 Install wood strapping behind all plywood panels to receive electrical, communication or mechanical devices, switches, controls and similar components. Strapping shall be nominal 25 x 50 mm (1" x 2") material located at 400 mm (16") oc. Recess vertical edge of furring of member adjacent to edge of panel 25 mm (1"). Cut ends of vertical furring 16 mm ($^5/_8$") back from top and bottom edges of panels.

3.6 **Rough Bucks and Nailers**

.1 Securely install wood bucks and nailers as required.

.2 Unless otherwise detailed, use material minimum 38 mm ($1^1/_2$") thick fastened with 9 mm ($^3/_8$") bolts located minimum 300 mm (12") from ends of members and uniformly spaced at minimum 800 mm (32").

3.7 **Clean-up**

.1 Remove debris and waste from site and leave 'broom clean'.

-End-

PART 1 – GENERAL

1.1 General

.1 All conditions of the Contract and Division 1 apply to this Section.

.2 This Section specifies general requirements and procedures for rough carpentry related to roofing work. Additional requirements may be specified in individual sections of the specifications.

1.2 Related Work

.1 Related work specified elsewhere.

Section 07510 Bituminous Roofing

Section 07620 Metal Flashings & Trim (Roofing)

Section 07900 Roofing Sealants

1.3 Reference Standards

.1 CSA B111-1974 Wire Nails, Spikes and Staples.

.2 CAN/CSA-G164-M92 Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CSA O121-M1978 Douglas Fir Plywood.

.4 CAN/CSA-O141-91 Softwood Lumber.

.5 CSA O151-M1978 Canadian Softwood Plywood.

.6 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber 1991.

1.4 Quality Assurance

.1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood identification: by grade mark in accordance with applicable CSA Standards.

1.5 Supervision and Qualifications

.1 Provide a competent Foreman to supervise all work and act as the Contractor's representative unless otherwise designated.

.2 Employ only experienced and qualified workmen and ensure that workmanship conforms to the best standard practices. Replace all work that results from inferior products or workmanship.

1.6 Coordination

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

.2 Refer to Section 07510, paragraph 1.4.2.

1.7 Summary of Work

.1 Install wood blocking and related air seals at all locations including but not limited to, perimeters, curbs and wall/roof transitions as shown on the roof plan and details.

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

1.8 Examination

.1 Do not commence work until surface to be covered has been inspected.

.2 Inspect work and advise the Architect of conditions that would adversely affect the work of this trade.

.3 Adjacent Construction and installation of related work is incorporated and complete.

.4 Commencement of work is proof that the Contractor has accepted surfaces as satisfactory for intended operations and accepts responsibility for appearances and performance of completed work.

.5 Repair damage and inferior work caused by work of this Section with materials and finish to match the original to the Architect's approval.

1.9 Samples

.1 When requested, submit samples in accordance with Section 07510.

1.10 Mock-ups

.1 Provide a 600mm (2'-0") mock-up of wood blocking system, including related air seals for each detail or profile for review in a location designated by the Architect/Consultant in accordance with Section 07510.

.2 Review mock-up to ensure design intent can be achieved. Verify all intersecting and adjoining elevations to ensure that continuity of roofing and air seals can be achieved. Verify attachment, methods for securing and pullout strengths to ensure that work can support the anticipated loads and will remain in place against all wind, weather and service conditions without warping or deforming.

1.11 Storage and Handling

.1 Provide and maintain dry, raised weatherproof storage.

.2 Protect materials from weather at all times.

.3 Remove only as much materials that can be incorporated, covered and made watertight the same work period.

.4 Use dry material only. Remove from site any materials that have been exposed to moisture, snow or ice.

PART 2 – PRODUCTS

2.1 Lumber Material

.1 All lumber sizes are specified and shown as nominal.

.2 Blocking and Rough Framing: to National Lumber Grades Authority, Standard Grading Rules for Canadian Lumber Spruce, "Construction" light framing, No. 1 spruce.

.3 Cants: 100mm X 100mm (4.0" X 4.0") No. 1 spruce.

.4 Plywood: Size as specified or shown exterior grade, Douglas Fir to CSA Standards 0121-M1978, medium density good one side.

2.2 Fasteners

.1 Wood to Wood Nails & Spikes: Galvanized spiral to CSA Standard B111-1974, of sufficient lengths so that not less than half the length protrudes completely into the underlying member. Screws: Galvanized, #7 flat head to CSA Standard 1335.4-1972 and ANSI B18.6.1-1981 and of sufficient length to completely penetrate through bases minimum 13mm (0.5"). Nails and screws shall be a minimum 3.2mm (0.125") in diameter. Fasteners for plywood sheathing shall be minimum 50mm in length.

.2 Wood to Steel Deck: Secure bottom nailer with minimum two rows of #10, 6mm (0.25") galvanized steel screws at maximum spacing of 600mm (2'-0"). Screws shall be sufficient length to penetrate top flute of decking a minimum 13mm (0.5") and a maximum of 19mm (0.75"). Screws to be factory coated with an additional corrosion protection equivalent to Rawl Perma-Seal or better.

.3 Wood to Concrete: Tapgrip, Permagrip, or Rawl Spike 6mm (0.25") diameter screws. Length to provide a minimum 32mm and maximum 40mm embedment into substrate as required. Drill holes 13mm (0.5") deeper than depth of fastener penetration. Type to be approved subject to results of pull tests.

.4 Metal to Wood or Masonry: Use #10 cadmium plated hex head screws with neoprene and steel washers by Atlas Bolt or approved equal. Minimum length 38mm (1.5"). Use lead shields, Rawl or equal as required for anchoring. Colour of screw head to meet approval of Architect/Consultant.

Provide touch-up paint as required to coat all exposed surfaces of screws damaged during the driving process.

2.3 Accessories

.1 Metal Air Seal: 26 gauge galvanized or pre-finished metal unless otherwise shown or specified. (Metal deck only).

.2 Flexible Air Seals: FR40 by Lexcor Roofing Products.

.3 Spray-in-Place Polyurethane Foam Insulation: to CAN/ULC 705.1 and 705.2-98.

2.4 Finishes

.1 Galvanizing: to CAN/CSA-G164-M92, use galvanized fasteners for all work.

PART 3 - EXECUTION

3.1 Examination

.1 Do not install wood blocking, air seals, vapour barrier or underlay until surface to be covered has been installed and inspected.

.2 Inspect work and advise the Architect of conditions that would adversely affect the work of this trade.

.3 Commencement of work is proof that the Contractor has accepted surfaces as satisfactory for intended operations and accepted responsibility for appearances and performances of completed work.

.4 Defective work resulting from work on unsatisfactory surfaces will be considered the responsibility of those performing the work of this Section.

.5 Repair damaged and inferior work caused by work of this Contract with materials and finish to match the original.

3.2 Installation

.1 Provide carpentry alterations and comply with best practices of the trade. Work to be completed by skilled carpenters.

.2 Unless specified, provide all labour and materials required to remove and reset all electrical and mechanical services required to facilitate carpentry work using matching materials and finish.

.3 Drawings are in part demographic and do not regard blocking, air seals or fastening provisions as shown on drawings as exact or complete. Provide required provisions for air seal fastening, located and secured to suit site conditions and adequate for intended support.

.4 Lay out work carefully conforming to details provided. Cut and fit accurately. Align, level, square, plumb and secure work permanently in place. Join wood only over solid backing. Allow 2mm (0.19") space between ends of plywood sheets for expansion purposes.

.5 Where applicable, ensure that existing wood blocking to be incorporated with the work is in good condition and permanently and properly secured to existing surfaces. Report, document and replace of deteriorated or damaged material and re-secure as required to conform to design intent herein described.

.6 Offset all joints of adjoining materials minimum 1200mm (4'-0"). Plywood sheathing is to be installed with all edges supported and secured at 200mm (8") o.c. Install sheathing ensuring surface grain is perpendicular to the vertical framing members (studs).

.7 Provide specified air seals under all wood blocking and extend up vertical surface above the cant strip minimum 50mm (2.0") and onto the roof minimum 100mm (4.0") beyond insulation stops to maintain buildings air tightness. Mitre and overlap corners and end joints minimum 50mm (2.0") and seal all overlaps and corners with caulking. Install additional ply of self -seal membrane overlapping joints minimum 150mm (6.0").

.8 Where irregular surfaces interfere with the proper installation of the metal air seal, keep metal back and where required, install flexible membranes. Overlap flexible membrane onto metal air seal

minimum 75mm (3.0") and seal solid with polyurethane caulking. Where metal or flexible air seals cannot provide continuity of building airtight diaphragm, install two components foam to ensure continuity and air tightness.

.9 Notch wood blocking and cants as required around anchor points or irregular surfaces so as to achieve design intent. Back or face cut wood blocking with 3mm (0.125") relief cuts as required to ensure blocking conforms to curves or unusual slopes or shapes. Do not impair the wood blocking's structural integrity or service function.

.10 Install cant strips and blocking as indicated on the drawings, secured permanently to structure, trimmed and leveled to accommodate cambers and slopes. In accordance with design intent, install to accommodate insulation, roofing and flashings. Ensure that the cants are adequately secured to prevent warpage under service conditions.

.11 Unless otherwise shown, build-up wood blocking a minimum of 300 mm (12.0") above finished roof surface at all curbs.

.12 Typically, offset and countersink all fasteners flush with surface of wood blocking being secured.

.13 Unless otherwise shown on drawings, level the top of all curbs to compensate for roof slope.

.14 Slope the top of all wood blocking at the roof perimeter to the roof side at minimum 2:12 unless otherwise noted or shown on the drawings.

.15 Slope the wood blocking at expansion and control joints and wall to a minimum of 2:12, unless otherwise noted or shown on the drawings.

.16 Remove all sharp edges that could damage materials.

3.3 Securement

.1 Comply with more stringent requirements as required by drawings, Building Code or Factory Mutual's requirements. Increase the number and spacing of all fasteners by 50%, 2400mm (8'-0") from the corners of the roof.

.2 Install fasteners to the design intent to hold all wood blocking permanently in place to prevent warping, deflection and to resist all wind and weather conditions.

.3 Secure wood to concrete at minimum 600mm (2'-0") with specified fasteners.

.4 Secure wood to metal with specified fasteners at minimum 450mm (18.0") o.c.

.5 Wood to wood, install 15mm (0.625") diameter galvanized steel washers under screw heads. Nail top nailers to bottom nailer with two rows of spiral galvanized nails 600mm (2'-0") o.c. Minimum penetration to be 32mm (1.25").

.6 Install all fasteners in two rows in the direction of the grain offset one to another in a staggered fashion by approximately 50%. All fasteners shall be placed minimum 10mm (0.44") from any edge of framing.

3.4 Review of the Contractor Work

.1 Field review of the Contractors work shall be completed in accordance with Section 07510.

3.5 Non-compliance With Inspection and Testing

.1 The correction of work shown to be in Non-compliance with inspection and testing shall be completed in accordance with Section 07510.

3.6 Warrantee

.1 The Warrantee of this Section shall be two years as specified for Section 07510.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1 :General Requirements.

.2 Provide materials, labour and equipment for the installation of site-applied wood trim, moldings, millwork, door frames and screens, shelving, and tack boards as shown on the drawings, described herein, or as necessary to complete the work.

1.2 Related Work Under Other Sections

.1 Section 06100: Rough Carpentry, [co-ordinating work with this section.]

.2 Section 07900: Sealants, [co-ordinating work with this section.]

.3 Section 08131: Steel Doors and Frames, [install work with this section.]

1.3 Applicable Codes and Standards

.1 Comply with requirements of Ontario Building Code, Ontario Occupational Health and Safety Act and municipal building By-laws and Regulations.

.2 Millwork to the Quality Standards of the Architectural Woodwork Manufacturers Association of Canada, AWMAC-2009, Custom Grade.

1.4 Qualifications

.1 All work of this section must be performed by carpenters having a minimum of (5) years experience in work of similar type. They must be certified by their respective associations for this type of work.

1.5 Delivery, Storage and Handling

.1 Deliver all materials as specified, any defective, damaged, warped material or material deemed to be inferior to the specification by the Architect will be promptly replaced.

.2 All materials shall be stored and stacked in order to prevent damage from exposure to moisture.

1.6 Co-ordination and Co-operation

.1 Co-ordinate and co-operate with all other trades to ensure satisfactory and expeditious completion of the work.

.2 Co-ordinate installation of work to be built-in by other sections, also equipment to be incorporated into finished carpentry work.

.3 Review drawings of other sections affecting work of this section to co-ordinate locations of other components.

1.7 Samples

.1 Submit 300 mm (12") long samples of each type of trim and molding.

.2 Do not proceed with work before the Architect's acceptance.

1.8 **Shop Drawings**

.1 For the following finish carpentry items, submit [6] copies of shop drawings clearly showing details of installation profiles, jointing and other related details.

1. Casework [site fabricated] & Trims
2. Mouldings
3. Wood Door Frames and Wood Screens

PART 2 - PRODUCTS

2.1 **Softwood Lumber:** To CSA-O141-1970 and NLGA Grading Rules, with maximum 14 percent moisture content. Use selected yard lumber for natural or paint finish. Clear Select Douglas Fir, Clear Select White Pine, Clear Select Red Cedar.

2.2 **Hardwood Lumber:** To National Hardwood Lumber Association [NHLA] standards, moisture content maximum 14 percent. Select Birch or Poplar as indicated on drawings or specified herein.

2.3 **Hardwood Plywood:** To CSA-O115-M1982 of thicknesses shown; plain sliced veneers; architectural grade, birch or poplar, good 1 side, sound other side, veneer on plywood core with Type 1 bond.

2.4 **Douglas Fir Plywood:** To CSA-O121-M1978 good 1 side sound other side select face, free from boats or defects.

2.5 **Miscellaneous Hardware:** To Section 05600: Miscellaneous Metals.

2.6 **Finished Hardware:** To Section 08710: Finish Hardware, supplied from hardware schedule.

2.7 **Fastenings:** Finishing nails and screws: To CSA-B111-1974, hot dip galvanized for exterior work, electrogalvanized for interior work, or resin coated nails for power nailing of interior work.

2.8 **Adhesive:**

.1 **For Millwork:** Polyvinyl adhesive to CSA-O112.4-M1977.

.2 **For Casework and Cabinetwork:** Water resistant urea resin to CSA-O112.5-M1977, Type 1 and 2.

2.9 **Sealing Tape:** Preformed butyl tape 10-15 durometer hardness, paper release, width and thickness, as specified by manufacturer.

PART 3 - EXECUTION

3.1 **Preliminary Work**

.1 Give at least [5] days notice to the Architect before starting work.

.2 Provide temporary protection to all interior areas during operations.

.3 Upon completion of any site fitting in which core materials are exposed, apply one coat of sealer to all such surfaces scheduled to be concealed in the finished work.

.4 Drill holes in steel members required unless steel members have been pre-drilled under separate sections. Obtain Architect's acceptance prior to drilling.

3.2 Installation - General

.1 Install plastic laminate work with concealed fastening devices. Method of securing plastic laminate work shall be reviewed before commencing installation. Fasteners shall not be more than 600 mm (24") oc and 150 mm (6") from edges and ends. Scribe edge of plastic laminate to abutting dissimilar surfaces to effect neat, true and plumb closure.

.2 Install woodwork to custom grade requirements of AWMAC. Where items are being installed under this section which are furnished by sections other than 06221.

.3 Install work in accordance with drawings and as specified to effect a secure, neat and complete installation.

.4 Install materials in longest lengths possible, jointing only where support is obtained. Erect materials plumb, level, square and to required lines. Accurately cut, fit, frame and fasten members in a neat manner consistent with quality specified.

.5 Space fastenings at not greater than 600 mm (2'-0") oc unless otherwise specified. Locate fastenings not more than 150 mm (6") from end of member. Fastenings shall be staggered such that centre of fastening device is not greater than the lesser of 38 mm (1-$^1/_2$") from edge of framing member, or $^1/_3$ the width member.

.6 Plugging of concealed fastening devices shall consist of solid plugs up to 25 mm (1") diameter, and 10 mm ($^3/_8$") plywood for holes over 25 mm (1") diameter; same species as surrounding wood. End grain plugs are acceptable.

.7 Incorporate accepted provision to recognize expansion and contraction characteristics of materials. Make joints to conceal shrinkage; mitre exterior corners; cope interior corners; mitre or scarf end-to-end joints. Use blind mitre splines and dowels where detailed on drawings or as necessary.

.8 Nail trim with finish nails of properly selected dimension to hold members firmly in place without splitting wood.

.9 On exposed finished work, set all nails for filler. Do not drive wood screws when setting.

.10 When preservative treated wood members are cut, planed or drilled under this section, apply wood preservative to freshly exposed surfaces in accordance with manufacturers instructions prior to permanently affixing such members.

.11 Provide cutouts as required for inserts, grilles, service devices and other fitments and fixtures as required by other Sections.

.12 Make allowance where fixed objects pass through or project into and around periphery of work of this Section to permit normal movement without restriction.

.13 Install all work provided by Section 06221: Factory Cabinet Work.

3.3 **Window Stools:**

.1 Permanently fix window stools to interior sill using appropriate construction adhesive, unless otherwise noted.

3.4 **Other Doors and Steel Frames**

.1 Accurately hang; fit plumb and square without binding doors shall swing shut with 1.5 mm ($^1/_{16}$") clearance at head. 2.4 mm ($^3/_{32}$") at jambs and 6 mm ($^1/_4$") clearance over finished floor surfaces.

.2 Install steel frames in locations where indicated. Verify position in wall relate to adjacent components and surfaces.

.3 Install steel frames using accepted temporary bracing members to anchor head member to structure above securely. Install frames rigid and accurately aligned plumb, level and true to line in all planes. Anchor floor plates on concealed face of jamb to floor substrate material in an accepted manner. Provide and install metal shims where required to ensure level and plumb vertical and horizontal alignment of all surfaces.

.4 Install jamb extension members to ensure rigid installation. Effect all connections in an accepted manner.

.5 Install temporary wood brace at head for frame openings wider than 1.4 m (4'-6") in masonry walls until masonry is complete and set.

.7 Remove doors for finishing and sealing of edges by Section 09900: Basic Painting and re-install when dry.

3.5 **Finish Hardware**

.1 Take delivery of and install all finish hardware including butts, hinges, snaps, closers, panic hardware, strikes, bolts, escutcheons, cylinders,

weatherstripping and any other supplied. Check each item as received and distribute to respective door sections.

.2 Install all other items as directed by Architect.

.3 Install lock cylinders to specialty items such as aluminum entrances, and the like.

.4 Make provisions for counter-sinking or counter-boring screw heads.

.5 Mount door stops for swing doors where hardware may contact wall finish or built-in fitments.

.6 Fix push and pull plates with minimum 6 screws each. Fix kick plates with screws at not more than 150 mm (6") oc. Where push and pull sets are back-to-back, mount with suitable through bolts.

.7 Install matching strike boxes with locksets and latchsets.

.8 Unless otherwise specified, allow minimum throw of 13 mm ($^1/_2$") for dead bolts.

.9 Install extension flush bolts to top and bottom of inactive leaf of pairs of doors without panic devices or other emergency hardware.

.10 Refer to section 08710 for further installation information.

3.6 **Final Finishing**

.1 Sandpaper finished wood surfaces thoroughly as required to produce uniformly smooth surface, always sanding in direction of grain run, except do not sand wood which is scheduled to be left rough. No coarse grained sandpaper mark, hammer mark, or other similar imperfections are acceptable.

.2 Clean work and notify painter when work is ready for sealing and finishing. Inspect work and co-operate fully in adjusting work to the Architect's approval.

3.7 .1 On completion of all work in building, check woodwork and plastic laminate work carefully for defects. Clean plastic laminate surfaces and remove identification marks.

.2 Adjust and refit working parts, and refinish as required to provide smooth operation without sticking and binding.

.3 Damage to work of this section attributable to work under separate sections shall be corrected by this section at no cost to owner.

3.8 **Interior Trim**

.1 Install, glue and finish nail to AWMAC Standard, custom grade.

.2 Select running trim to match adjacent pieces of even colour, grain and texture.

.3 Set nails and secure neatly; leave no hammer or drive marks; securely anchor to wall or floor bearings.

3.9 Completion

.1 Clean work and notify painter when work is ready for sealing and finishing. Inspect work and co-operate fully in adjusting work to the Architect's approval.

-End-

PART 1 – GENERAL

1.1 General

.1 This section specifies general requirements and procedures for built-up bituminous roofing. Additional requirements may be specified in individual sections of the specification.

1.2 Related Work

.1 Related work specified elsewhere.

Section 01001	General Requirements
Section 02075	Roofing Removal and Preparation
Section 06101	Rough Carpentry (Roofing)
Section 07620	Metal Flashings and Trim (Roofing)
Section 07900	Roofing Sealants
Section 15000	Mechanical
Section 16000	Electrical

1.3 References

All listed references are to be the latest edition.

.1	ASTM D1863	Specification for Mineral Aggregate Used on Built-Up Roofs.
.2	ASTM D2178	Specification for Asphalt Glass (Felt) Used in Roofing and Waterproofing.
.3	CSA A123.2-M	Asphalt Coated Roofing Sheets.
.4	CSA A123.3-M	Asphalt Felts.
.5	CSA A123.4-M	Bitumen for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems.
.6	CAN/ULC S-706-1	Insulating Fibreboard (formerly CSA-A247-M86)
.7	CGSB 37-GP-9MA	Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
.8	CGSB 37-GP-15M	Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
.9	CAN/CGSB 37.29-M	Rubber-Asphalt Sealing Compound.
.10	CAN/ULC S-701-01	Thermal Insulation, Urethane and Isocyanurate, Boards, Faced.
.11	CAN/CGSB-51.33-M	Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
.12	CAN/ULC 705.1-	Spray Applied Polyurethane.
.13	CAN/ULC 705.2-	Spray Applied Polyurethane (application).
.14	CAN/ULC S770-	Determination of long term thermal resistance (LTTR) of closed cell thermal insulating foams.

1.4 Coordination

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

.2 Electrical:
1. Supply and install electrical services for new addition areas.
2. Extend existing services to raise equipment, etc., on reroof areas.

.3 Mechanical:
1. Provide all new plumbing as per plans and specifications.
2. Provide connection of drains to plumbing at new and existing locations as required. Coordinate installation of underdeck clamps for drains with Roofer.

3. Supply and install steel curbs for new equipment. Locate and provide deck opening and reinforcement as required. Coordinate with General Contractor.
4. Cap existing drains no longer intended for use.
5. Relocate and raise gas line to detail.
6. Extend existing services to raise equipment on areas or reroofing.

.4 General Contractor:

1. Coordinate with Roofer to protect new and existing roofing from foot traffic and damage.
2. Supply and install wood blocking. Coordinate with roofers for air seal supply.
3. Supply and install new metal siding and wall system per Architectural drawings and specifications.
4. Provide and locate deck openings for new drains and mechanical/electrical projections to drawing and specifications. Coordinate with Roofer and Mechanical.
5. Provide deck openings for new mechanical/electrical and new equipment at proper locations. Reinforce to meet structural requirements.

.5 Roofer:

1. Supply and install electrical sleeves and flashings. Coordinate with appropriate trades.
2. Supply and install mechanical sleeves and flashings. Coordinate with appropriate trades.
3. Supply and install drains - from topside use U-Flow where inaccessible from below. Coordinate size number and locations with Mechanical Contractor and Architect.
4. Flash new metal curbs where shown to detail.
5. Provide metal deck closure over closed off drains and roof over.
6. Remove unused equipment curbs, provide deck closure to details and roof over.
7. Supply and install gas line support system to details and specifications
8. Supply and install new residential perforated aluminum soffits at perimeter overhangs to details.
9. Coordinate with Roof Inspector to remove roof samples for laboratory testing as per specifications.

.6 Other Trades:

1. Review documents to determine and ensure proper coordination with associated trades.

1.5 Summary of Work

.1 See Section 01011.

1.6 Shop Drawings

.1 Submit shop drawings for tapered insulation.

1.7 Material List

.1 Submit to the Architect/Consultant, a list of all materials intended for use before ordering.

1.8 Samples

.1 Submit samples of materials intended for use as specified.

1.9 General Requirements

.1 Comply with the General Requirements, General Instructions and Supplementary Conditions.

.2 Execute work in accordance with Summary of Work, Drawings and Details.

.3 Anchor roofing to meet requirements of Insurance Underwriter and authorities having jurisdiction.

.4 Regard Manufacturer's printed recommendations as minimum requirement for materials, methods and workmanship not otherwise specified.

.5 Contact the Architect/Consultant if the specifications conflict with the Manufacturer's recommendations. Otherwise it will be assumed that the Contractor and Manufacturer are in agreement with procedure outlined.

.6 Advise the Architect/Consultant of adjustments to specified roofing procedures recommended by Manufacturer's due to weather and site conditions. Make adjustment to specified procedures only after review with the Consultant.

.7 Roofing should not be applied when temperature is below -26°C (-15°F), including wind chill.

.8 Lay out work to avoid working over newly installed felts. If any foreign material is inadvertently incorporated into the membrane, remove the material immediately and repair to restore membrane to its original integrity. All repair felt shall lap over the repair area and each succeeding ply 150 mm (6.0") in each direction. Broom all repair areas into place to ensure positive contact.

.9 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.

.10 Avoid foot traffic or prolonged point loading on membrane before bitumen has set as this will result in displacement of bitumen between plies or felt.

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

1.10 Storage and Handling

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

.2 Do not store material on roof.

.3 If insulation or other roofing products are shipped to the site in plastic wrap, cut or remove wrap. Keep material covered with waterproof, breathable covering and protect stored materials from moisture and degrading effects of the sun.

.4 Elevate on raised platform minimum 100 mm (4.0") high and store as to prevent deformation of materials. Remove only those required for day's operation.

.5 At temperatures below 51°C (40°F), store membrane roofing, adhesive and sealants that will be affected by temperature in dry heated storage. Remove product immediately prior to installation.

.6 Protect temperature sensitive materials and products such as adhesives from cooling on the roof by providing temporary shelter or immerge in warm water bath.

.7 Protect edges of all rolled goods. Stand on end to prevent deformation.

.8 Remove and replace all wet or damaged materials.

.9 Do not store aggregate on roof. Keep covered during inclement weather. Heat to dry by acceptable method prior to installation.

1.11 Special Protection

.1 Coordinate work to ensure that special protection against damage from traffic or work performed on top of membrane during work of this and other Sections are provided.

.2 Protect roofing used as a working platform by plywood sheets installed over work area including hoisting, pumping and traffic zones. Underlay platform with 2 Mil polyethylene when installed directly over bituminous membrane. Remove when not in use, otherwise weight down to prevent removal by the wind.

.3 Protect walls with tarpaulins and plywood in hoisting and asphalt pumping areas and secure from being dislodged by the wind.

.4 Following roofing, protect all openings, vents and stacks from weather and contamination from debris.

.5 Provide temporary plumbers plugs to protect drains during roofing operations. Ensure that temporary protection is removed at completion of work period.

1.12 Identification/Delivery

.1 Provide to the Owner and Consultant, WHMIS Material Safety Data Sheets for materials supplied.

.2 Provide bill of lading for bulk loads of bitumen clearly showing Equiviscous Temperatures (EVT), Flash Point (FP) and Final Blowing Temperature (FBT).

.3 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.

.4 Inspect insulation for physical and moisture damage, size, cupping, bowing and edge cavitations. Reject all defective material. Mark defective material with spray paint and remove from site immediately.

.5 Reject all defective material and mark with spray paint to ensure it is not incorporated into roofing system.

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

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

1.13 Environmental Requirements

.1 Ensure protection of products that are sensitive to damage by moisture. Do not work during rain, snow or fog. Stop work and make watertight before the onset of inclement weather or when weather appears imminent.

.2 Ensure protection of the building from weather at all times. If inclement weather is forecast or appears imminent, postpone work that would risk the building from moisture damage.

.3 If it becomes apparent that work would threaten the buildings water tightness, 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.

1.14 Compatibility

.1 Compatibility between components of the system and adjacent materials is essential. Use only materials that are known to be compatible when incorporated in a completed assembly. Notify the Architect/Consultant in writing when the materials and components of the assembly do not 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 interference with performance.

1.15 Existing Substrates

.1 Following removal of existing material to the substrate, inspect the new and existing deck for soundness and notify the Architect/Consultant of any deck found unsound and not suitable for roofing. Do not commence work until you have documented conditions and obtained a ruling from the Architect/Consultant on the acceptability of surfaces and/or corrective measures required. The cost of any delays due to postponement of work that results from investigating the site problem or obtaining a ruling will be at the Owner's expense.

.2 The commencement of work is proof that the Contractor has accepted surfaces as satisfactory and accepts responsibility for appearance and performance of completed work.

.3 Defective work resulting from application of material on unsatisfactory surfaces will be considered the responsibility of the Contractor.

.4 The Contractor will be responsible for all repairs, costs and pay all cost and fees required to rectify damage or defective work. Use materials and finish to match the original.

1.16 Daily Operations

.1 Unless otherwise specified, complete entire roofing operation up to line of termination of each day's work as required by design intent in order to safeguard and protect the work and building from damage and weather. Do not leave bitumen membrane exposed.

1.17 Asphalt

.1 Heat asphalt to obtain proper application temperature and viscosity at point of contact. The EVT Temperature is the temperature when the asphalt attains a viscosity of 125 centistokes for hand mopping and 75 centistokes for mechanical application. To compensate for wind chill, ambient temperature and shading a tolerance of 15°C (25°F) is allowed. Keep asphalt in constant use to prevent distillation.

.2 If heating temperatures are not supplied on the containers or bills of lading for the asphalt on site, heat to no more than 246°C (475°F) for Types II and III.

.3 In cold weather, insulate pump pipes and transport bitumen on roof in insulated carriers to minimize temperature fall back between kettle and point of application.

.4 Bitumen shall not be heated to flash point or held at final blowing temperature for more than 4 hours to prevent asphalt fallback.

.5 Unless otherwise specified by Manufacturer literature, use the following EVT Temperatures.

Mechanical Application	Mop Application
Type II 430°F (±25°F) 221°C (±15°C)	Type II 410°F (±25°F) 210°C (±15°C)
Type III 462°F (±25°F) 239°C (±15°C)	Type III 437°F (±25°F) 225°C (±15°C)

.6 Maintain constant supervision of tankers kettles to ensure that bitumen is not overheated. Check temperature of bitumen in kettle at a minimum of 30-minute intervals with an accurate thermometer. Maintain a record of bitumen temperatures.

.7 **Do not place kettles on the roof**.

.8 Install all bitumen in a uniform, continuous application insuring good adhesion is achieved. For organic felts, apply at the rate of not less than 1.0 kgs/m^2 (20 lbs/100 ft^2) per ply and for glass felts not less than 1.2 kgs/m^2 (25 lbs/100 ft^2) per ply. Ensure that bitumen bleeds out from both sides of the roll not less than 23 mm (0.5").

.9 Use Type II for slopes from 63 mm/m to 127 mm/m (0.75" to 1.5"/ft.) (1:16 to 1:8).

.10 Use Type III for slopes greater than 127 mm/m (1.5" to 3.0"/ft.) (1:8 to 1:4). And for felt flashings.

1.18 Examination

Before proceeding with roofing application, ensure that:

.1 All surfaces are clean and free of debris, snow, frost and moisture.

.2 The deck is clean and sufficiently dry to ensure specified adhesion will be obtained.

.3 Adjacent construction and installation of related work (i.e. Curbs, drains, penetrations, wood nailers, etc.) incorporated with the roof are complete.

.4 Roof deck is sound, existing fasteners are tight and irregularities are corrected to provide a suitable surface for new roofing.

.5 Ensure substrate is smooth. Remove sharp edges or protrusions that could impair the function of the roof assembly.

.6 Inform Owner/Consultant in writing of any defects.

1.19 Drains and Drainage Plane

Inspect surfaces and ensure that:

.1 Roof deck is level or sloped to drains in conforming to design intent.

.2 Roof drains are set at a level to drain and are connected or capped.

.3 Take spot levels to verify that pools of water in excess of 13 mm (0.5") depth will not form.

.4 Tabulate levels and submit to Architect/Consultant.

.5 Ensure plumbing is accessible and work can be completed as specified.

.6 Inspect roof drains to ensure they are open and working properly.

.7 Where specified or shown for areas with only one drain, provide overflow scuppers or drains to detail and specified requirements.

1.20 Examine Underside Of Deck

.1 Where feasible, inspect the underside of deck to ensure fasteners will not be visible, damage the structure, effect interior surfaces or electrical and mechanical services.

1.21 Hidden Services

.1 Investigate the location of all known hidden services by reviewing interior conditions, plans, specifications and drawings for the original building, any subsequent alterations, completion of cut tests and interviewing those involved in the construction and maintenance of building services. These services include but are not limited to mechanical, electrical, cable, communication, computer, security or roof assembly. Ensure all services are located and will be protected from damage under the Contract. In some cases, services may be located over the roof deck and within the roof assembly. Notify Owner/Consultant in such occurrence and proceed with installation as directed.

1.22 Equipment

.1 Inspect equipment affected by the work, including but not limited to roof top equipment, curbs, existing drains and plumbing, mechanical, electrical and services, to ensure they are in good repair and working order. Record any damage and advise the Consultant.

.2 During re-roofing, ensure that all mechanical equipment, ducts, pipes, etc. are properly supported.

.3 Notify Owner and/or Consultant of any equipment that is not operational or damaged prior to the commencement of work.

1.23 Advise Architect/Consultant

.1 Advise the Architect/Consultant of any unusual circumstances affecting the work. Notify the Consultant of any defective or malfunctioning equipment or drains found plugged, damaged or leaking. Do not commence work until defects and incorrect levels have been verified and rectified.

1.24 Proceeding with Work

.1 The commencement of work is proof that the Contractor has accepted surfaces as satisfactory and accepts responsibility for appearance and performance of completed work.

.2 Be responsible and repair and pay all cost and fees required to rectify damage caused by work of this Contract with materials and finish to match the original.

1.25 Protection of Roof Top Equipment

.1 Remove any equipment and flashing intended for re-use and save from harm. Store in approved location and reset at project conclusion unless specified or shown to be removed.

.2 Protect all openings, vents and stacks from weather and contamination from debris.

.3 Provide temporary plumbers plugs to protect drains during roofing operations. Ensure that temporary protection is removed at completion of work period and/or at the end of each days work.

1.26 Services

.1 Services are to be left operational unless otherwise authorized by the Owner.

.2 Unless otherwise specified, the General Contractor will be responsible for disconnection, relocation, re-installation and extending all services required to facilitate work under this Contract. Coordinate work with the Owner and provide minimum of 48 hours notification if services are to be interrupted.

.3 Contractor to verify location of services prior to commencement of work. Notify Owner/Architect/Consultant of any unusual conditions.

.4 The Contractor and their employees must hold valid certificates for the work undertaken.

.5 Complete work of this section as required by local authorities having jurisdiction. Have work inspected and pay all fees relative to such inspection to ensure work meets with published standards and codes.

.6 Submit Certificate or Letter of Approval by authority responsible for the work to the Owner, Architect and Consultant with final documentation.

.7 Prior to re-roofing all mechanical or electrical equipment, accessories are to be verified as operational or not. Where equipment is non-functional following re-roofing, the Contractor will be responsible to restore equipment to its original condition.

PART 2 – PRODUCTS

2.1 General

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

.2 Compatibility between materials is essential. Use only materials that are known to be compatible when incorporated in a complete assembly.

2.2 Asphalt, Bitumen and Felts

.1 Organic Felts: No. 15 asphalt-saturated roof felt, perforated conforming to CSA Standard A123.3 M1979.

.2 Inorganic Felts: Type IV saturated glass fibre roofing felts to ASTM D2178-85a and CSA A123.17.

.3 Dry Sheet: Unsaturated No. 15 felt.

.4 Bitumen: Roofing asphalt conforming to CSA Standard A123.4M. 1979.

.5 Asphalt Primer: Conforming to CGSB Standard 37-GP-9Ma-83.

.6 Modified Roofing Sealants: See Section 07901 Sopra Mastic by Soprema, Polybitume by Monsey Bakor Inc., Polyroof by Tremco or approved equivalent.

.7 Flexible Membrane: FR-40 by Lexcor Roofing Products.

.8 Self-Adhering Membrane, Primer and Accessories: Ice & Watershield manufactured by W.R. Grace Co. of Canada Ltd. or approved equivalent. Provide complete with primer and joint sealer suitable for surfaces encountered.

2.3 Vapour Retarders and Air Seals

.1 Vapour Retarder and Air Seal on Concrete Deck: 2-ply No. 15 felt mopped solid with bitumen.

.2 Steel Applications: Kraft paper edge reinforced Duplex, Type II conforming to requirements of ULC, CAN/CGSB 51.33-M89 Factory Mutual. Use Permstop 40/60/40 or approved equivalent.

.3 Vapour Retarder Adhesive: ULC and Factory Mutual listed in conformity with Manufacturer's recommendations for materials being employed.

.4 Air Seal on Steel Deck: Minimum 26 gauge galvanized or pre-finished steel. Profile to suit site conditions.

2.4 Insulations

.1 Fibreboard: Thickness as specified or shown, high density asphalt impregnated conforming to CAN/CSA A247-M86 and CAN/ULC S706. Maximum board size 600 x 1200 mm (2'-0" x 4'-0").

.2 Polyisocyanurate Insulations: Rigid foam board Type III, Class 2, manufactured with HC blowing agent meeting requirements of CAN/ULC S-126 and CAN/ULC S107. Conforming to CAN/ULC S704 and CAN/ULC S770 for LTTR values. Approved and listed by Factory Mutual Global for 1-60 and 1-90 wind classification and FM 4450 requirements for Class 1 fire. Thickness as specified or shown with maximum board size 1200 mm x 1200 mm (4'-0" x 4'-0").

.3 Tapered Drain Sump Insulation: Thickness as specified or shown polyisocyanurate conforming to 2.4.2 above. To be supplied by Acc-Plane or Posi-Slope. Submit shop drawings for review **prior** to fabrication.

.4 Tapered Insulation: Fibreboard as specified in 2.4.1 above.

.5 Polystyrene Extruded Foam Board: Thickness as shown or specified and conforming to CAN/ULC S701-97 Type IV, by Dow Chemical.

.6 Mineral Fibre: Thickness as shown or specified to CAN/ULC S702-97. Roxul or approved equal.

.7 Spray In Place Urethane: Thickness as shown or specified to CAN/ULC S705.1-01 Materials and CAN/ULC S703.2-98 Application.

.8 Batt Insulation: Fibreglass thickness as shown or specified to CAN/CGSB 51.11-M92 manufactured by Owens Corning.

2.5 Miscellaneous Fixtures

.1 Vent Stack Flashing: SJ-20 or SJ-26 pre-insulated spun aluminum with telescoping cap complete with stainless steel vandal proof cap by Thaler Metal Industries Inc.

.2 Metal Sleeve: Fabricate from one-piece 454 gms. (16.0 oz.) copper or 26-gauge stainless steel fabricated minimum 300 mm (12.0") high above finished roof surface, with 125 mm (5.0") flange as approved by the Consultant. All seams to be continuous and soldered.

.3 Copper Roof Drains: Model RD-4C with flat hub by Thaler Metal Industries Inc. Size to match existing or 75 mm (3.0") where new on existing building. On New addition, provide size as specified per mechanical division. New drains to have mechanical connection using double clamp to drain body and R.W.L. Use Fernco coupling or approved equivalent. Existing drains to be connected with

U-Flow seals where inaccessible from below. Mechanical connections are by Mechanical Contractor, U-Flow by Roofing Contractor.

.4 Scuppers and Overflows: Size and materials as specified or shown, fabricated from 454 gms. (16.0 oz.) copper, 26-gauge stainless steel or 25-gauge PVC coated metal with minimum 125 mm (5.0") roof flange and gravel guard to Consultant's approval. Make all seams continuous and watertight by soldering or heat welding.

.5 Aggregate: 10 mm to 16 mm (0.375" x 0.625") clean, washed, round pea gravel. To ASTM D1863-98.

.6 Concrete Pavers: Unless otherwise specified or shown, 600 mm x 600 mm x 38 mm (2'-0" x 2'-0" x 1.5") welded wire mesh reinforced concrete pavers. To CSA A231.1-1972 with 6%-8% air entrainment to 30 Mpa.

.7 Deck Closure: Per detail #8.

.8 Gas Pipe Support: Wood blocks on paver to detail with Thaler Mers 702-2 stainless steel roller assembly. Size to suit gas line.

.9 Bituminous Metal Paint: "Gilsonite Asphalt 410-02" by Monsey Bakor Inc. to CGSB1-GP-108 Type II.

.10 Primer: Zinc rich, ready mix to CAN/CGSB-1.181-92.

2.6 Fasteners

NOTES:

1. OBTAIN CONSULTANT'S AND OWNER'S APPROVAL WHEN USING HAMMER DRILLS SINCE DRILLING HOURS MAY BE RESTRICTED.

2. ALL FASTENERS FOR STEEL, WOOD, CONCRETE AND SPECIALTY DECKS MUST MEET FACTORY MUTUAL APPROVALS.

.1 Use galvanized, copper, aluminum or stainless nails or screws as most compatible with materials being employed. Screws shall be minimum 38 mm (1.5") #10 cadmium plated hex head with neoprene and steel washers by Atlas Bolt or approved equal. Rawl lead shields as required for anchoring. Use fasteners as most generally suitable to Consultant's approval.

.2 General Fasteners: No. 10 ardox nails of length to penetrate bases minimum 13 mm (0.5"). Horizontal Membrane Fasteners: Use 50 mm ardox (2.0") nails with minimum 25 mm (1.0") solid caps for securing membrane to insulation stops. Nails and caps to be hot dipped galvanized or mechanically galvanized to CSA G164-M198. Supply by Lexcor (1-800-268-2889) or AMA Roof Supplies (1-877-594-6071) or approved equal.

.3 Vertical Flashing Fasteners: Nails, Tapgrip or Permagrip fasteners with 25 mm (1.0") solid caps. Minimum length 38 mm (1.5"). Nails and caps to be hot dipped galvanized as per **.2** above.

.4 Insulation Fasteners: Standard Factory Mutual approved 75 mm (3.0") hexagonal metal plates and corrosion coated anti-backout screws.

.5 Screws: Minimum 38 mm (1.5") #10 cadmium plated hex head with neoprene and steel washers by Atlas Bolt or approved equal. Rawl lead shields as required for anchoring.

PART 3 - EXECUTION

3.1 Priming

.1 Prime masonry and concrete surfaces which will be in direct contact with asphalt at the rate of 0.15L/m^2 (0.33 gal/100ft^2) to CGSB 37-GP-15M. Ensure that surfaces are tack-free before proceeding. For self adhering modified bitumen base sheet flashing, install primer recommended by Membrane Manufacturer at a rate of 0.15 lb/m^2 to 0.25 lb/m^2.

.2 Limit quantity of primer at deck openings and points of termination to prevent bleedthrough to the building interior.

.3 Broom primer into surface.

.4 Re-prime all surfaces that become contaminated with dust or become marred due to their exposure to roof traffic or weather.

3.2 Vapour Retarder On Steel Decks

.1 Roller apply fire retardant adhesive to cover entire upper flutes of steel deck. Install 1-ply of specified vapour retarder with 100 mm (4.0") side laps and 150 mm (6.0") end laps sealed solid with adhesive.

.2 Ensure that side lap occurs on top of flutes of metal deck. Encountering imperial sized deck which does not fit metric size vapour retarder will require sufficient side laps to ensure locate over flute.

.3 Broom vapour retarder into place to ensure total contact with adhesive.

.4 Lap and seal vapour retarder onto air seal to maintain systems continuity. Overhang vapour retarder at edges and turn back on top of insulation minimum 150 mm (6.0"). Seal solid with bitumen and avoid contaminating adjacent surfaces.

3.3 Air Seals

.1 Unless otherwise specified or shown, install 26 gauge galvanized or pre-finished metal under all wood blocking and 24-gauge at roof drains on steel decks. Mechanically secure metal to deck and extend minimum 100 mm (4.0") beyond wood blocking on horizontal and 50 mm (2.0") above top of cants on vertical surfaces to provide continuity of vapour/air seals. Overlap side laps minimum 50 mm (2.0") and seal overlap solid with caulking.

.2 On concrete or wood decks, extend vapour barrier under wood blocking.

3.4 Vapour Retarder On Concrete Decks

.1 Vapour retarder to consist of 2-plies of No. 15 felt laid solid with asphalt.

.2 Complete work and maintain water tightness of assembly.

.3 Cover open joints and cracks in deck in a 150 mm (6.0") wide strip of #15 felt mopped with limited quantities of bitumen. Keep bitumen back from deck openings and points of termination to prevent bleedthrough.

.4 Install vapour retarder continuously under wood blocking at perimeters and roof openings. Provide separate ply of #15 felt mopped in asphalt to envelope insulation as specified or shown. Overhang vapour retarder at edges where insulation is to be encapsulated. Install in maximum 3 m (10') lengths and turn back on top of the insulation minimum 150 mm (6.0") and seal solid with asphalt. Avoid contaminating adjacent surfaces with bitumen.

.5 Install felts running with or at right angles to slope of deck as specified or dictated by roof design. Broom felts into place to ensure total contact with bitumen.

.6 Surface of felts may be left temporarily uncoated if completed operation is to be finished the same day. If scheduled operation cannot be completed the Contractor shall coat all surfaces solid with bitumen and install temporary enveloping seals at all points of termination.

.7 If the vapour retarder is to be used as a temporary roof and the Contractor chooses to leave the felts uncoated to allow for foot traffic, the Contractor shall install one additional ply of glass felt laid solid with Type III bitumen.

.8 Temporarily lower drains and provide seals to drains and roof penetrations. Remove and replace air seals and raise to elevations dictated by design intent before proceeding with roofing operation. The cost of this additional work shall be included in the base price.

3.5 Base Insulation

.1 Install base insulation over vapour retarder to specified design intent and thickness in conformity to Summary of Work, Drawings and Details.

.2 On steel decks, install insulation by applying asphalt. Sprinkle mop over vapour retarder at a rate not exceeding 1.5 kg/m^2 (15 lbs/100ft^2) to hold insulation in place. Mechanically fasten base insulation to requirements of Factory Mutual I-90.

.3 Over bituminous vapour retarder and for multiple insulation layers, secure insulation laid solid with Type III 1.0-1.5 kg/m^2 (20-25 lbs/100ft^2) asphalt.

.4 Stagger all joints of insulation a minimum 300 mm (12.0").

.5 Stagger both end and side joints between insulation layers.

.6 Butt sheets of insulation with moderate contact. Do not force insulation into place. Cut neatly at projections and points of termination. Replace all broken, damaged or misfit boards as work progresses.

.7 Where necessary, back-cut insulation to allow it to conform and stay bonded to irregular surfaces without bridging. Subsequent to placement, walk insulation into place to ensure positive bonding is achieved.

.8 Shim all insulation at areas of deck depression or deflections with solid Fibreglass insulation to maintain the level of finished surface.

.9 At areas of ponding water provide minimum 900 mm (3'-0") wide drainage channels by cutting base insulation sloped from low point to drain. Check elevation with level and straight edge. Ensure positive slope to drain is achieved.

3.6 Mechanical Insulation Fasteners

.1 On areas of steel deck, mechanically secure base layer of new insulation to the deck.

.2 Inspect the underside of the deck to ensure fasteners will not damage the structure, interior surfaces or affect electrical, mechanical, communications, fire alarms or security services.

.3 Advise Architect/Consultant of any unusual circumstances affecting the work. Be responsible and correct all damage caused by work to match existing materials and finish.

.4 Use screw-type anti-backout corrosion resistant fasteners with 75 mm (3.0") plates as generally required by the Summary of Work and Specifications.

.5 Conform to Factory Mutual requirements for the length, spacing and number of fasteners required to provide I-90 rating.

.6 Ensure that mechanical fasteners engage the top flange of steel decks and penetrate through to underside by minimum 13 mm (0.5"). A chalk line guide is recommended to ensure fasteners engage the top flange of deck. Workmen shall be properly trained to understand the signs of mechanical fastener full engagement.

.7 Where deck conditions dictate, complete pull test to confirm optimal type, size and spacing of fasteners. Adjust fastener size and spacing upon recommendations by the Manufacturer for the materials being employed, subject to the Consultant's review. Also adjust fastener length to accommodate tapered insulation or site cut insulation as required by site conditions.

3.7 Tapered Insulations

.1 Provide shop drawings from tapered insulation Manufacturer for Consultant's review prior to fabrication.

.2 Where shown around perimeters, install width and thickness of tapered fibreboard insulation shown on tapered insulation plan and details 38 mm – 0 mm (1.5"-0") over base insulation set in a solid coat of Type III asphalt. Allow for wood blocking to compensate for additional insulation thickness.

.3 At all drain locations, provide tapered polyisocyanurate insulation to form a sump each side of drain to promote positive drainage. Insulation to be tapered per shop drawings from thickness matching bases insulation to 13 mm (0.5"). Make allowance for thickness of flange and clamp to ensure water flow will not be impeded. Adjust drain sumps and locations to suit site conditions.

3.8 Cap Insulation and Separation Sheet

.1 Cap base insulation with a 13 mm (0.5") layer if fibreboard insulation underlaid with 1-ply of Type IV glass felt separate sheet laid solid with Type III asphalt. Surface of felt may be left temporarily uncoated if complete roof system is to be finished the same work period.

.2 At all points of termination, install 1-ply of #15 felt 300 mm (12.0") wide in maximum 3.0 metre (10'-0") lengths set in asphalt. Turn felt back minimum 150 mm (6.0") on top of fibreboard insulation. Overlap end joints minimum 150 mm (6.0").

.3 If the scheduled roof membrane cannot be completed, temporarily withhold the installation of the 13 mm (0.5") cap insulation and install two plies of Type IV glass felt at all points of terminations coated solid with asphalt to provide temporary water seal. The cost of the additional work shall be borne by the Contractor.

.4 Stagger both end and side joints of coverboard with first layer of insulation by minimum 300 mm (1'-0"). Offset end joints by a minimum 300 mm (1'-0") between adjoining rows of coverboard.

.5 Butt sheets of insulation with moderate contact. Do not force insulation into place. Cut neatly at projections and points of termination. Replace all broken, damaged or misfit boards as work progresses.

.6 Where necessary, back-cut insulation to allow it to conform and stay bonded to irregular surfaces without bridging. Subsequent to placement, walk insulation into place to ensure positive bonding is achieved.

3.9 Membrane Roofing

.1 Ensure all substrate surfaces are dried by artificial or natural means before installation of membrane.

.2 The roof membrane is to be constructed from 4 plies of No. 15 felt with plies overlapping 698 mm (27.5”). 3+1 or 2+2 applications are not acceptable.

.3 Roof and broom each ply into uniform solid layer of bitumen to obtain complete embedment.

.4 Install felts smooth, free of wrinkles, air pockets, fishmouths and tears. Coinciding end joints area not acceptable.

.5 All fishmouths in membrane are to be cut and worked into bitumen immediately while bitumen is still hot. Repair all fishmouths with an additional ply of glass felt extending a minimum 150 mm (6.0”) in each direction of defect.

.6 Do not gang roll felts during application as this will result in the displacement of bitumen. Keep rolls a minimum 2.0 metres (6.5’) apart during application. Protect new membrane from wheel and foot traffic until bitumen is set.

.7 Commencing at low points, install felts across slope in continuous application to the top of cants.

.8 Ensure that felts at inside and outside corners fit tight to all verticals without gaps. Seal membrane at top of cants with a continuous light coat of asphalt as work progresses. Cut membrane at all changes in plane to assure proper bond to surfaces.

.9 Extend felts to the top of cants at all vertical surfaces in a continuous operation to provide waterproof seal while bitumen is still hot. Secure membrane at 212 mm (8.5”) o. c. in centre of insulation stop at the toe of the cant strip while bitumen is still hot and prior to installing membrane flashings. Locate fasteners 38 mm (1.5”) from edge of overlapping plies. Glaze coat all felts with asphalt after securing membrane to installation stops.

.10 Avoid coinciding end joints where possible. Terminating felts and cross strippings in ends in not acceptable. Use equipment and application techniques approved by Consultant.

.11 Install an additional 2-plies of fibreglass felt in solid bitumen to reinforce defects and lap joints where the membrane changes direction. On roofs with positive slope, install an additional 2-plies of fibreglass felt at low points continuing up slope 1500 mm (5’-0”). On roofs without positive slope, install an additional 2-plies of glass felt in and beyond drainage sump as specified under roof drain section.

.12 Overnight Tie-In: Protect all work and provide temporary weatherproofing seals at points of termination of each day’s work. The temporary seals are to consist of a minimum 1 ply of No. 15 felt laid dry over the junction with 2 plies of No. 15 felt laid solid with bitumen lapping onto and existing membrane a minimum 300 mm (12.0”) before proceeding. Remove and trim all temporary overnight seals to allow for tight fitting joints with following days work.

3.10 Bituminous Membrane Flashing

.1 Install membrane flashings at eaves, curbs, walls and joints consisting of 4 plies of No. 15 felt set in Type III asphalt.'

.2 Immediately upon completion of membrane installation, seal the membrane at the top of cants with modified sealant to form a temporary seal. Do not install flashings until bitumen membrane has cooled and set; otherwise, protect membrane with plywood underlaid with a layer of 0.051 mm (6 mil) polyethylene.

.3 Do not install flashings until bitumen membrane has cooled and set; otherwise, protect membrane with plywood underlaid with a layer of 0.051 mm (6 mil) polyethylene. Remove temporary protection following installation.

.4 When membrane flashings are to be constructed from felt and bitumen, install felts in workable lengths in a solid coat of bitumen.

.5 Install felt flashings in full mopping of Type III asphalt. Broom or work felt into bitumen to obtain complete embedment. Install felts without coinciding end joints, smooth free of wrinkles, air pockets and tears.

.6 Carry first 2 plies of membrane flashings to the inside face of solid wood curbs to be used for equipment bases. Carry the last ply over and turn down the inside face minimum 50 mm (2.0").

.7 Fold over and secure membrane flashings on the outside face of the building with nails and caps, install 225 mm (9.0") o.c. Carry membrane up all walls, curbs, joints etc., to points shown on the drawings. Secure the top of membrane flashings at vertical surfaces with fasteners at 225 mm (9.0") o.c. with 25 mm (1.0") heads.

.8 Seal all points of termination with modified sealant as shown on the drawings.

.9 Install 4 plies of No. 15 felt laid in solid coat of Type III bitumen. Extend first ply of felt 100 mm (4.0") beyond toe of cant onto roof and overlap each succeeding ply 75 mm (3.0").

.10 Coat finished surface of felt flashings with bitumen immediately upon installation.

3.11 Installing New Copper Drains At Existing Drain Locations

.1 Install new Thaler RD-4C drains at existing drain locations to requirements of Summary of Work, drawings and details. Size new drains to properly fit existing rain water leader and Mechanical Contractor to connect with mechanical connection as detailed where accessible. Where inaccessible, connect form roof side with U-Flow connections.

.2 Remove or cut existing drains to deck level ensuring existing drainage pipe, interior insulation and surfaces are not disturbed or damaged during installation. Inspect to verify that connections and piping are in good condition, air and gas tight.

.3 Remove bitumen or other debris from surfaces that could interfere with installation and advise Consultant of any abnormalities.

.4 Repair any damaged or disturbed surfaces as required to match existing materials and finishes.

.5 Install flexible flashing air seal around drain under flange and extend onto deck minimum 150 mm (6.0”). Overlap roofing vapour retarder onto flexible flashing minimum 150 mm (6.0”) set in Type D sealant.

.6 Install sloped polyisocyanurate insulation sumps each side of drain as per Tapered Insulation Plan to provide positive drainage as specified in the Summary of Work. Reduce insulation thickness to minimum 13 mm (0.5”) at drain making allowance for thickness of all flanges and clamps to ensure water flow will not be impeded. Adjust drain sumps as required to suit site conditions.

.7 Extend separation sheet and 13 mm (0.5”) fibreboard over tapered insulation drain sump to detail and as specified elsewhere.

.8 Coat drain flange with Type C sealant and mop 1-ply No. 15 felt in the sump as an underlay to the membrane. Install membrane roofing continuously through sump and over flange and neatly trim felts to interior face and seal with modified sealant.

.9 Coat last ply of felt with bitumen and set clamp ring in solid bed of Type C sealant. Secure clamp ring and integral screen as dictated by drain design immediately after membrane is installed. Tighten bolts to ensure a permanent watertight compression seal. Torque to 10.0 lbf ft. pressure with torque wrench.

.10 Clean strainer free of obstructions subsequent to the installation of the bitumen and aggregate surface.

.11 Install test plug, water test roof and repair leaks. Remove test plug once complete.

.12 General Contractor to restore interior finishes affected by work of this Contract to match original materials and finish to Consultant’s approval.

.13 Where applicable, subsequent to installation, tighten U-Flow seal to Manufacturer’s requirements to provide a permanent gas and watertight seal.

3.12 Install New Copper Drains

.1 Install new Thaler 75 mm (3.0") RD-4C drains at locations shown on Roof Plan to requirements of Summary of Work, drawings and details. On new addition and deck replacement area, supply and flash drain as specified in Division 15. Deck opening and plumbing to be supplied and installed by Division 15.

.2 Coordinate with General Contractor and verify that location will allow for positive drainage and will not conflict with existing rooftop equipment, structure, below deck mechanical and electrical services.

.3 Verify thickness of deck to ensure that rain water leaders are of sufficient length to allow plumbing alterations and connections.

.4 For costing and practical purposes location of new drains shown are to be considered 3048 mm (10'-0"). Adjust locations as required to facilitate installation without additional cost.

.5 General Contractor to cut neat hole through roof and deck assembly 25 mm (1.0") larger than specified drain size to facilitate drain and plumbing installation. Use X-Ray or cover meter to locate service lines and prevent damage to reinforcement during coring. Use core drill on all concrete decks. Trim bitumen membrane 25 mm (1.0") from opening to prevent bitumen drippage.

.6 Install flexible flashing air seal around drain under flange and extend onto deck minimum 150 mm (6.0"). Overlap roofing vapour retarder onto flexible flashing minimum 150 mm (6.0") set in Type D sealant.

.7 Install sloped polyisocyanurate insulation sumps each side of drain as per Tapered Insulation Plan to provide positive drainage as specified in the Summary of Work. Reduce insulation thickness to minimum 13 mm (0.5") at drain making allowance for thickness of all flanges and clamps to ensure water flow will not be impeded. Adjust drain sumps as required to suit site conditions.

.8 Extend separation sheet and 13 mm (0.5") fibreboard insulation over tapered insulation drain sump to detail and as specified elsewhere.

.9 Coat drain flange with Type C sealant and mop 1-ply #15 felt in the sump as an underlay to the membrane. Install membrane roofing continuously through sump and over flange and neatly trim felts to interior face and seal with modified sealant.

.10 Coat last ply of felt with bitumen and set clamp ring in solid bed of Type C sealant. Secure clamp ring and integral screen as dictated by drain design immediately after membrane is installed. Tighten bolts to ensure a permanent watertight compression seal. Torque to 10.0 lbf ft. pressure with torque wrench.

.11 Clean strainer free of obstructions subsequent to the installation of the bitumen and aggregate surface.

.12 Install test plug, water test and repair leaks. Extend mechanical services required by the Summary of Work, specifications and drawings and remove test plug once complete.

.13 Restore interior finishes affected by work of this Contract to match original materials and finish to Consultant's approval.

.14 Where applicable, subsequent to installation, tighten U-Flow seal to Manufacturer's requirements to provide a permanent gas and watertight seal.

3.13 Plumbing Vents Stacks and Sleeves

.1 Inspect and clean soil pipes of debris to operational condition.

.2 Make all rood penetrations air and watertight by installing flexible membrane seal over pipe extending 150 mm (6.0") onto roof deck. Clamp flexible membrane to projection and seal to provide air/vapour seal. Seal flexible membrane to roofing vapour retarder with hot asphalt or adhesive as applicable.

.3 Adjust existing pipes to specified heights by either cutting down or extending pipes with matching materials attached with mechanical couplers. Ensure pipes are 38 mm (1.5") higher than flashing to allow for sealing to prevent condensation. Protect all flashings not to be covered with roofing with heavy paper and masking tape to prevent damage and bitumen stains.

.4 Set sleeve flashings on top of completed membrane roofing.

.5 Set and cover flanges in Type D sealant.

.6 Flash all flanges with 3-plies of No. 15 felt and bitumen. Install first ply 25 mm (1.0") onto, and continue second and third to upturn. Extend first ply 150 mm (6.0"), second ply 225 mm (9.0") and third ply 300 mm (12.0") beyond flange.

.7 Coat finished surface of membrane flashings with bitumen immediately upon installation.

.8 Insulate all sleeves (except unit heater stacks), with loosely packed glass fibre insulation or spray with one part polyurethane foam. Some stacks are pre-foamed off site by Manufacturer. Seal openings between flashings and pipes with Type B sealant sloped to shed water.

.9 On soil pipes, install telescoping caps sealed continuously with Type B sealant to prevent condensation traps.

.10 On stacks, install rain collars to match sleeve material. Solder rain collars up to 22 gauge and weld 22 gauge or heavier. Where neither is possible, caulk collar with Type B sealant.

.11 Remove and replace all damaged flashings and poorly fitting collars. Clean exposed surfaces free of bitumen before leaving site. Paint all sleeves marred with bitumen with paint to match flashing colour.

3.14 Bituminous Aggregate Surfacing

.1 Do not install bitumen and aggregate surface until membrane and membrane flashings are complete, inspected and accepted. Ensure membrane and flashings have set prior to gravelling operation.

.2 Prior to installation of bituminous and aggregate surface carefully inspect and repair all defects and deficiencies in the membrane and flashing that was not corrected during the initial installation.

.3 Pour hot bitumen flood coat over entire surface without skips at a rate of not less than 3 kg/m^2 (60 lbs/100 ft^2). Apply full covering of gravel at the rate of not less than 24 kg/m^2 (500 lbs/100 ft^2). If skips are found, sweep back gravel and re-flood area.

.4 Remove all loose gravel and embed a second full coat of bitumen and aggregate 5.0 metres (15'-0") at all outside corners of the building and 600 mm (2'-0") back from all roof openings.

.5 Provide a double pour of asphalt and gravel at locations where ponding depth exceeds 6 mm (0.25") to disburse water to nearest drain. Contractor is to include to re-pour 5% of the total roof area in the original bid.

.6 Repeat application of bitumen and aggregate for total aggregate mass of 48 kg/m^2 (10.0 lbs/100ft^2).

.7 Apply second pour only after first has been inspected by Consultant.

.8 Check areas with broom to ensure proper embedment of aggregate. Clean and re-pour all areas as required to obtain a maximum 40% of adhesion of aggregate into bitumen.

.9 On each roof section provide 10% extra gravel for use in future repairs. Spread gravel over area as not to overload the structure.

3.15 Concrete Pavers

.1 Install concrete pavers where shown to requirements of Summary of Work, drawings and details.

.2 Install paver on 38 mm (1.5") thick layer of extruded polystyrene insulation underscored in both directions at 150 mm (6.0") o.c. to allow for drainage and venting. Cut insulation 38 mm (1.5") smaller on all sides than paver so overhang protects insulation from direct sunlight. Build up gravel at edge of paver for additional protection to insulation.

.3 When bolting wood or equipment to pavers pre-drill holes through paver and install bolt from underside through to top and secure equipment with washers and nuts. Countersink bolt heads to protect membrane.

3.16 Gas Pipe Supports

.1 General Contractor will be responsible for relocating and raising the existing gas line minimum 300 mm (12.0") above finished roof level as required by Summary of Work, drawings and details.

.2 Elevate gas line on supports to maximum 300 mm (12.0") above finished roof surface or to clear all expansion and control joints by 25 mm (1.0") unless otherwise specified or shown. Provide concrete pavers under gas pipe supports as specified elsewhere in this Section. Install on pressure treated wood pipe supports to detail and secure to concrete paver as shown.

.3 Secure wood to concrete paver with two galvanized iron bolts installed through holes drilled through paver. Insert bolts from bottom and bolt to paver with washer and nut tightened for positive securement. Secure pipe to wall blocking with a galvanized clamp. Ensure clamp allows 3 mm (0.125") minimum spacing and will accommodate movement of pipes due to expansion and contraction.

.4 Install supports at spacing required to support the pipe without deflection and to safeguard the roof from damage due to excessive spot loading. Maximum loading of paver 244 kg/m^5 (50 lbs/100 ft^2).

.5 Locate pipe supports over joists, beams or other structural members wherever possible.

.6 Obtain Architect's requirements for support spacing. Double pads will be required where pipes change direction, roof elevation changes and at roof control or expansion joints.

.7 Complete work of this Section as required by local authorities having jurisdiction. Have work inspected and pay all fees related to such inspection to ensure work meets with published standards and codes. Submit certificate or letter of approval with final documentation to Owner's Project Coordinator and Architect.

3.17 Contractor Quality Control

.1 The Contractor shall appoint a workman for the purpose of quality control on the construction site (Quality Control Inspector) to ensure that the work is installed in accordance with the Contract, specifications and drawings. In addition to procedures that may be specified elsewhere the Contractor's Quality Control Inspector shall:

1. Maintain a written record of the workmen on site and progress of each days work.
2. Maintain a written record of materials shipped to and incorporated in the work including dates, name of manufacturer, type of material, lot and serial numbers and compliance standards as written on the labels.
3. Retain the labels for each type and lot of material.
4. Monitor the temperatures of tankers and kettles to ensure that bitumen is not overheated. Check temperature of bitumen in the tanker, kettle, mop cart or felt layer at a minimum of 30-minute intervals with an accurate thermometer. Maintain a written record of bitumen temperatures. Provide a copy of test results to the Consultant for each work period.
5. Remove one roof sample, 305 mm X 305 mm (12.2" X 12.2") randomly located for each days work (minimum 1 per roof section) where directed on site by the Consultant. Consultant will retain sample and deliver to testing laboratory. Larger samples may be requested at no additional cost.
6. Remove samples of membrane before installation of gravel.
7. Fill void of the sample with fibreboard and bitumen to match the height of membrane. Restore bitumen membrane to match existing materials and finish by repairing area of cut test with 4-ply of felt and bitumen. First ply of felt to lap onto the roof minimum 150 mm (6.0") each side of cut test and each additional ply to lap minimum 75 mm (3.0") beyond preceding ply.
8. The services of R. A. M. Bitutech Analytical Services Inc. (testing laboratory) at tel: 905-878-8993, fax: 905-878-5166 will be retained for the testing of all felt, asphalt and membrane samples.
9. Comply with testing laboratory's and Consultant's recommendations as it relates to removing, wrapping, labeling, handling and recording of samples.
10. Consultant will deliver the samples to the testing agency on a daily basis and have test results faxed to the Owner/Contractor no later than two days following removal of samples.
11. Testing of samples shall be in accordance with ASTM D3617.
12. In the event that test results are unsatisfactory additional cut tests and lab testing may be required, the cost of which will be borne by the Contractor.

3.18 Field Review by Consultant

.1 Field review of the work will be completed by Fishburn Building Sciences Group Inc. (Consultant).

.2 Examination of materials' certificates and test reports shall not be construed as relieving the Contractor of his responsibility for proper completion and guarantee of the work in accordance with the Drawings and Specifications.

.3 Notify the Architect/Owner/Consultant and material Manufacturer at least 48 hours before roofing operations commence, and arrange for a site meeting for discussion of procedure. Subsequently, give two working days prior notice for the commencement of each phase of work. Notify of delays and re-starts.

.4 Cooperate with Consultant and afford all facilities necessary to permit full inspection of the work and testing of materials prior to, during their use and during the warranty period. Make cutout for testing

purposes when and where required and make good roofing of test areas and of any and all defects of materials and workmanship without additional cost.

.5 Do not conceal or cover any phase of work until after it has been inspected and approved.

.6 Inspection of the Contract Documents as to extent of work, quality of workmanship and materials, methods, etc. is the responsibility of the Architect.

3.19 Non-compliance with Inspections and Tests

.1 If the initial inspection and tests required to establish compliance with the Contract Documents indicates non-compliance with the Contract Documents, subsequent testing or re-inspection occasioned by non-compliance shall be performed. The cost of re-inspection and testing will be borne by the Contractor and deducted from the price of the Contract.

.2 The Contractor shall replace or correct defective work not done in accordance with the Contract. If, in the opinion of the Architect, it is not expedient to correct defective work or work done in accordance with the Contract, the Owner may deduct from the Contract price the difference in valued between the work as done and called for by the Contract, the amount of which will be determined by the Architect.

.3 Replace all work that results from inferior products or workmanship.

3.20 Clean Up

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

.2 Leave roof clean of debris and bitumen left by spills and machine tracking.

.3 Leave grounds and building free of debris and bitumen spread by pedestrian traffic where applicable. Rake out excessive piles of aggregate and trim to neat, even surface.

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

.5 Check drains to ensure they are functional and where required removal of all debris by vacuum.

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

.7 Be responsible to repair and pay all costs and fees required to rectify damage caused by work of the Contract with materials and finish to match original.

3.21 Inspection and Testing

.1 Work of the Section shall be inspected in accordance with Section 01400 of the Fishburn Roof Construction Guide.

.2 Allow for and obtain 300 mm X 300 mm (12.0” X 12.0”) samples for testing purposes as per Section 01400 of the Fishburn Roof Construction Guide.

.3 Repair and test cut to match existing material and finish.

-End-

PART 1 – GENERAL

1.1 General

.1 All conditions of the Contract and Division 1 apply to this Section.

.2 This Section specifies general requirements and procedures for metal flashing and trim. Additional requirements may be specified in individual sections of the specifications.

1.2 Related Work

.1 Related work specified elsewhere

Section 06101	Rough Carpentry (Roofing)
Section 07510	Bituminous Roofing
Section 07900	Roofing Sealants
Section 15000	Mechanical
Section 16000	Electrical

1.3 Reference Standards

.1 CSA/CAN 3-G3 12.1-75 – preferred metric dimensions for flat metal products.

.2 Canadian Roofing Contractor's Association Manual.

.3 SMACNA – Architectural Sheet Manual – 1993 Edition.

1.4 Supervision and Qualifications

.1 Provide a competent Foreman to supervise all work and act as the Contractor's representative unless otherwise designated.

.2 Employ only experienced and qualified workmen and ensure that workmanship conforms to the best standard practices. Replace all work that results from inferior products or workmanship.

1.5 Coordination

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

.2 Refer to Section 07510, paragraph 1.4.2.

1.6 Summary of Work

.1 Provide metal flashings but not limited to roofs perimeter, wall and roof openings in accordance with drawings, details and specified requirements.

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

1.7 Examination

.1 Do not commence work until surface to be covered has been inspected.

.2 Inspect work and advise the Consultant of conditions that would adversely affect the work of this trade.

.3 Adjacent Construction and installation of related work is incorporated and complete.

.4 Commencement of work is proof that the Contractor has accepted surfaces as satisfactory for intended operations and accepts responsibility for appearances and performance of completed work.

.5 Repair damage and inferior work caused by work of this Section with materials and finish to match the original to the Consultant's approval.

1.8 Submittals

.1 Submit to the Architect/Consultant a list of materials intended for use before they are ordered.

1.9 Samples

.1 When requested, submit samples in accordance with Section 07510.

.2 Provide samples of material without additional cost to the Architect/Consultant for review.

1.10 Mock-ups

.1 Submit shop drawings and provide mock-up in accordance with Section 07521. Before installing materials, provide a 1200 mm (4'-0") mock-up for each profile before fabrication.

.2 Mock-up samples to indicate type, colour, size, method of joints, seam, expansion provisions, stiffeners, cleats fasteners and method of sealing joints. Fit mock-up to each applicable roof profile or edge.

.3 Review mock-up with drawings to ensure design can be achieved. Verify all elevations including those with matching materials and sections. Verify attachment, methods for securing and strengths to ensure that work can support the anticipated loads and will remain in place against all wind, weather and service conditions without warping or deforming.

.4 Make all adjustments to the work that results from a review of the mock-up without additional cost.

.5 Acceptable mock-ups may be left in place as part of the final product.

PART 2 – PRODUCTS

2.1 Sheet Metal Materials

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

.2 Compatibility between materials is essential. Use only materials that are known to be compatible when incorporated in a completed assembly.

.3 Pre-finished Metal Flashings: As shown on drawings, fabricate from 24-gauge steel to Standard with G90 zinc coating. Surface with Stelco Series 10,000 baked enamel finish. Colour to match existing from Manufacturer's standard colour range.

.4 Copper: 16oz. Or 20oz. (454 gm or 567 gm).

.5 Cleats and Hook Strips: Unless otherwise shown, 22 gauge, matching materials of flashing being employed.

.6 Solder: Block solder 50% tin, 50% lead to ASTM B32-87.

.7 Use galvanized, copper, aluminum or stainless steel nails or screws as most compatible with materials and preservatives being utilized.

.8 Nails: Annular threaded of length to penetrate into bases minimum 25mm (1.0"). No. 8 screws to penetrate wood 19mm (0.75") at 600mm (2'-0") o.c.

.9 Masonry Fasteners: Tapcon, Permagrip or Tapgrip or Rawl spike sized to penetrate concrete 38mm (1.5") minimum as specified or shown.

.10 Exposed Fasteners: Where exposed fasteners are specified or shown, use No. 10 screws with metal and neoprene washers pre-finished to match colour of flashing. Alternatively, use screws with colour match nylon caps where shown or approved by the Architect.

.11 Screws for Hook Strip & Fascia: No. 8 or 9, 400mm (16.0") o.c.

.12 Wedges: Rolled plumbers sheet lead.

.13 Sealant: Unless otherwise shown, use single component chemical curing polyurethane type compound for concealed horizontal metal joints, reglets and exterior uses, to CAN/CGSB Standard 19.13 – M87, Type II. Use colour to match materials. Primer as recommended by caulking Manufacturer Dymonic by Tremco or equal.

.14 Bitumen Paint: Gilsonite asphalt 910-02 by Bakelite or approved equivalent to CGSB. 1-GP-108, Type II.

.15 Underlay: Smooth unsaturated quality rosin paper weighing not less than 0.3kg/m^2 (60lbs/100ft^2) unless otherwise shown. To CSA A123.3 M1979.

.16 Self-Adhering Membrane: 1.0mm SBS prefabricated sheet with cross laminant polyethylene by W.R. Grace Co. of Canada Ltd. or approved equivalent.

2.2 Fabrication

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable details as indicated.

.2 Fabricate all possible work in shop in maximum 2400mm (8'0-0") lengths by brake forming, bench cutting, drilling and shaping. Match existing profiles where metal flashing is to be repaired.

.3 Hem exposed edges on underside 13mm (0.5"). Mitre and seal corners with sealant.

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

.5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

.6 Double-back exposed metal edges at least 13mm (0.5"). Rawl edges will not be permitted.

.1 Supply all accessories required for installation of sheet metal work of this Section. Fabricate accessories of same material to which they will be used.

PART 3 - EXECUTION

3.1 Installation

.1 Install sheet metal flashings at copings, walls, expansion joints, roof openings and other components required to protect the membrane flashings as shown on the drawings, or otherwise required.

.2 Install continuous concealed hook strips at all exterior faces. Install continuous interior lock strips where shown. Install cleats between lock joints and as required to permanently hold flashing in place. Install lock strip fasteners in "V" pattern with maximum spacing of 150mm (6.0") o.c.

.3 Sheet metal work shall be installed to cover the entire area it protects and shall be watertight under all service and weather conditions. Install in a uniform manner, true to line, free of dents, warping and distortion.

.4 Back-paint sheet metal that comes into contact with another kind of metal, masonry or concrete with bituminous paint at the rate of 0.15L./m^2 (0.33gal/100ft^2).

.5 Install sheet metal with concealed fasteners at lock joints. Use exposed fastening where shown on the drawings. When exposed fasteners are shown, space all fasteners evenly in an approve manner.

.6 Install underlay sheathing paper under sheet metal installed directly over wood masonry or where surfaces have been coated or contaminated with Bitumen.

.7 Install 1-ply of self-adhering membrane to detail under sheet metal on horizontal or vertical surfaces, which are not otherwise covered by membrane flashings.

.8 Ensure all surfaces to be covered with self-adhering membrane are complete and free of moisture, contaminants and are above 5°C (40°F). Heat materials to be covered with hot air gun. Store all materials in heated storage below 5°C (40°F) and remove only as much material that can be used before cooling.

.9 Prime all surfaces to be covered with self-adhering membrane. Let primer tack dry and complete thumb test to ensure compliance. Remove paper backing and install membrane true to line to completely cover the area intended to be protected to points shown on the drawing. Roll or work material into place by hand to ensure a positive bond. Membrane to be installed without air blisters and wrinkles. Rework, repair or replace all poorly installed membrane. Do not stretch material that would result in pull back and deformity of the membrane at intersections. Lap all side laps 75mm (6.0") and end laps 150mm (6.0"). Secure all membrane on vertical surface at points of termination at 150mm (6.0") o.c. Turn up membrane 150mm (6.0") at edge where horizontal surface meets vertical planes. Seal all points of termination at horizontal planes and vertical surfaces with modified sealant. Tool sealant to consistent, smooth and even surface. It is recommended that all self-

adhering membrane be installed by a team of two workmen. Avoid working in windy conditions or weather that would result in inferior product.

.10 Join sheet metal by "S" lock seams, to permit thermal movement. Seal all fasteners and completely fill all joints with caulking as flashing is being installed. Clean off all excessive visible material subsequent to installation.

.11 Space membrane joints evenly where exposed. When flashing is being installed in more than one piece, offset joints in adjacent flashings by approximately 50%.

.12 Form inside and outside corners by means of raised seams. Lock seams and caulk all overlaps to ensure watertightness. Do not use pop rivets.

.13 Slope all metal to interior roof area to maintain minimum 2:12 slope. Do not form open joints or pockets that fail to drain water.

.14 Caulk all open sheet metal joints.

.15 Where existing reglets are to be re-used, re-cut to conform to the size requirements specified below.

.16 Provide new reglets minimum 10mm (0.375") wide and 25mm (1.0") deep.

.17 Clean reglets and adjacent surfaces free of contaminants and dust.

.18 Wedge flashings into reglet joints with lead wedges at 225mm (9.0") o.c. Keep back from face of reglet joint 6mm (0.25"). Fill joints with polyethylene rod.

.19 Complete all work in accordance with Section 07900.

3.2 Review of the Contractor Work

.1 Field review of the Contractor's work shall be completed in accordance with Section 07510.

3.3 Non-compliance With Inspection and Testing

.1 The correction of work shown to be in Non-compliance with inspection and testing shall be completed in accordance with Section 07510.

3.4 Warrantee

.1 The work of this Section shall be included in the Warrantee as specified for Section 07510.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment to install the following, as shown on the drawings, specified herein, or as necessary to complete the work. This includes:

.1 Prefinished metal flashing.

1.2 Related Work Under Other Sections

.1 Section 06100: Rough Carpentry, [co-ordinating with work of this section.]

.2 Section 07900: Sealants, [co-ordinating with work of this section.]

1.3 Standards

.1 Do metal flashing to CRCA Standard FL501-607 and as specified.

1.4 Samples

.1 Submit duplicate 50 x 50 mm (2"x2") samples of each type of sheet metal material, colour and finish, for the Architect's approval.

1.5 Delivery and Storage

.1 Deliver in original packages and containers. Handle material to prevent damage to new and existing work.

1.6 Site Conditions

.1 Visit the site and ascertain all site conditions, limitations and requirements for protection of adjacent work and verify dimensions.

1.7 Warranty

.1 Provide a signed certificate warranting the application of sheet metal flashing, etc. for a [2] year period, against twisting, warping, splitting or any other fault liable to impair performance, commencing on date of final acceptance. Promptly make good at no expense any defects occurring or becoming apparent within the warranty period.

PART 2 - PRODUCTS

2.1 Materials:

.1 **Sheet Steel:** Galvalume 0.76 mm (22 ga.) minimum thickness, commercial quality to ASTM A526M-85 with Z275 designation zinc coating; or to ASTM Standard A792-85a with AZ150 metallic coating.

.2 **Prefinished Sheet Steel:** Factory applied coating to CAN/CGSB-93-GP-3M, Class F1S, 10000Series. Colour as selected by Architect; coating thickness minimum 20 micrometers; outdoor exposure period (15) years. Thickness specified for prefinished steel sheet applies to base metal.

.3 **Isolation Coating:** Alkali resistant bituminous paint.

.4 **Underlay for Metal Flashing:** Dry sheathing to CAN/CGSB-51.32-M77, asphalt laminated 3.6 to 4.5 kg kraft paper, No. 15 perforated asphalt felt to CSA-A123.3-M1979, or sheathing membrane, breather type to CAN/CGSB-51.32-M77.

.5 **Sealant:** CAN/CGSB-19.24-M90 low temperature range, wet conditions, movement range to 25 percent.

.6 **Cleats:** Same material, temper and thickness as sheet metal being secured; minimum 50 mm (2") wide.

.7 **Fasteners:** Material compatible with sheet metal, to CSA-B111-1974, ring thread, flat head roofing nails of length and thickness suitable for metal flashing application.

.8 **Washers:** Material compatible with sheet metal and fasteners, 1 mm thick with rubber packings.

.9 **Solder:** To ASTM B32-87, 50 percent tin and 50 percent lead.

.10 **Flux:** Rosin, cut hydrochloric acid, or commercial preparation suitable for materials to be soldered.

.11 **Touch-up Paint:** As recommended by manufacturer.

2.2 **Fabrication:**

.1 **General:**

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series specifications as indicated on drawings. Shop fabricate where possible and provide concealed fastenings where possible.

.2 Form pieces in 2400 mm (8 ft) maximum lengths. Make allowance for expansion at joints.

.3 Hem exposed edges on underside 13 mm ($^1/_2$"). Mitre and seal corners with sealant, corners to be standing lock seams.

.4 Carry out prefinished steel fabrication in clean shops, located away from areas where carbon steel is torch cut, ground, or cut with abrasive wheels to ensure that carbon steel dust will not be embedded in surface finish of steel. Clean tools and dies which have been used on carbon steel prior to fabrication of finished steel to prevent contamination of surface with carbon steel dust.

.5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance. To shapes, profiles, size as indicated on drawings or as necessary to complete the work.

.6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar, or in contact with dissimilar materials.

.7 Wipe and wash clean soldered joints immediately after joint is soldered to remove acid.

.8 Where soldered joints are absolutely necessary (and only where approved) in prepainted metal, clean paint off both surfaces before soldering for minimum area necessary.

.2 **Metal Gutters and Rainwater Leaders:** Form to profiles indicated on drawings of 0.76 mm (22ga) galvanized prefinished sheet steel. Rivet or screw all connections.

.3 **Metal Scupper Drains:** Form to profiles indicated on drawings of 0.76 mm (22 ga) galvanized prefinished sheet steel to profiles indicated on drawings. Seal with watertight joints

.4 **Metal Flashings:** Form flashings, copings and fascias to profiles indicated on drawings of 0.76 mm (22 ga) thick galvanized prefinished sheet steel. Solder galvanized steel. Rivet or screw prefinished steel connections.

.5 **Pans:** Form pans from 0.76 mm (22 ga) thick, galvanized steel sheet with minimum 75 mm (3") upstand above finished roof and 100 mm (4") continuous flanges with no open corners. Solder joints. Make pans minimum 50 mm (2") wider than member passing through roof membrane.

.6 **Cap Flashings:** Form metal cap flashing to profiles as indicated on drawings of 0.76 mm (22ga) thick, prefinished sheet steel, in accordance with CRCA 'FL' series details. Provide slotted fixing holes and steel/plastic washer fasteners. Cover face and ends with plastic tape.

.6 **Roof Hatch (2-required):** 30”x 36” galvanized steel roof hatch model ‘S’ c/w stainless steel hardware and integrated steel curb, by Bilco.

PART 3 - EXECUTION

3.1 **Preliminary Work**

.1 Give at least [5] days notice to the Architect before starting work.

3.2 **Installation**

.1 General: Install flashing and trim sheet metal work in accordance with CRCA specifications and as detailed.

.1 Use concealed fastenings except where otherwise approved before installation.

.2 Provide underlay under sheet metal. Secure in place and lap joints 100 mm (4").

.3 Counterflash through wall flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips, as detailed.

.4 Lock end joints and caulk with sealant.

.5 Commence installation of metal counter flashings after built-up bituminous and membrane flashings are inspected and accepted by Architect.

.6 Use lock-joints of type allowing for expansion and contraction. Install corners square or uniformly curved as applicable and surfaces straight and in true planes, free from oil-canning or other defects. Submit drawings for review showing location of joints in runs of exposed perimeter flashing.

.7 Connect each length of flashing at roof or perimeter curbs by an 'A' weathertight slip lock. Seal only at mitred corners or locations where a 'slip lock' would not be weathertight. Seal with specified material.

.8 Exposed fastenings are only permitted where concealed fastening is not possible. Locations must be approved by inspector before proceeding with work.

.9 Install metal drips, cleats, clips and starter strips as shown or required to hold flashing in true planes without deformation.

.10 Securely fasten flashings and counter-flashings over wood blocking at parapets by means of approved metal clips. The lower edges of the metal flashing shall be turned under at the bottom edge. Conceal fastening in completed flashing. Exposed fastening will be permitted only where indicated or where concealed fastening is not possible. Type and locations of exposed fastenings shall be approved.

.11 Where flashing and/or counterflashing are to be installed in reglets, make sure reglet has been provided. Do not attempt to flash without reglet where reglet is required. Crimp edges of flashing which are to be inserted in reglets and turn min. 1" into joints. Force lead wedges into reglet at 600 mm (2'-0") o.c. then seal joint with sealants.

.12 Co-operate with mechanical and electrical trades in achieving watertight, leak-proof passage of mechanical, electrical and other devices, which penetrate roofing membrane or wall surfaces.

.13 Seal at junction of metal counter flashings and the roof with rubber asphalt sealing compound.

.14 At completion of metal counter flashing installation clean off all surfaces to be sealed from bituminous residue or other contaminants which would affect the proper performance of sealant.

.15 Thoroughly backpaint with bituminous paint, all steel coming into contact with masonry, concrete or other dissimilar metals to protect against corrosion. Use slip sheets under all flashings.

.16 Provide underlay of resin sized paper or asphalt felt under sheet metal installed over masonry, concrete or wood. Lay underlay dry as sheet metal work is installed. Secure in place and lap joints 100 mm (4").

.17 Imperfections in sheet metal work such as holes, dents, creases, or oil-canning is caused for rejection.

.18 Repair damaged sheet metal work, wash entire installation down, and leave in neat condition.

.19 Provide all flashing required for proper execution and completion of work in acceptable manner including metal flashing around mechanical and other equipment and structures occurring on roofs.

.20 Install all copper scupper drains as indicated and detailed on drawings.

.21 Install roof hatch and curb as detailed on drawings and as per manufacturers instructions.

3.3 **Sealing:** To Section 07900: Sealants.

3.4 **Clean-up**

.1 Remove surplus materials, equipment and debris from the property and leave clean and tidy.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment to complete joint sealant work as shown on the drawings, schedules, resealing of existing joints, spray foam sealant, described herein, or as necessary to complete the work.

1.2 Related Work Under Other Sections

.1 Section 06200: Finish Carpentry, [provide and install all sealant.]

.2 Section 09900: Basic Painting, [provide and install all sealant.]

1.3 Standards

.1 Comply with Ontario Building Code, Parts 5 and 9.

1.4 Supervision

.1 Comply with the recommendations and directions of manufacturers whose materials are specified. Consult manufacturer's technical representative and discuss the following terms with decisions confirmed in writing by the Contractor.

.1 Weather conditions under which work will be done.

.2 Anticipated frequency of joint movement.

.3 Shape factor of the joint.

.4 Durometer hardness, slump and curing characteristics of materials specified.

.5 Joint characteristics as built.

.6 Sample of sealed joint to be acceptable to Architect prior to completion.

1.5 Environmental Requirements

.1 Ensure sealant and substrate materials are at minimum temperature +5 degrees C (40 degrees F).

.2 Where necessary to apply sealants below temperature of +5 degrees C (40 degrees F), follow manufacturers recommendations.

1.6 Co-ordination and Co-operation

.1 Co-ordinate and co-operate with all other trades to ensure satisfactory and expeditious completion of the work.

1.7 Warranty

.1 Provide a signed certificate warranting that caulking work will not leak, crack, crumble, melt, shrink, run, lose adhesion or stain adjacent

surfaces for a period of five [5] years after the certificate of final acceptance.

PART 2 - PRODUCTS

2.1 Materials

.1 **Primers:** Type recommended by sealant manufacturer.

.2 **Joint Fillers:**

.1 **General:** Compatible with primers and sealant, outsized 30 to 50 percent.

.2 **Extruded Closed Cell Foam:** Polyethylene, urethane, neoprene or vinyl; Shore A, hardness 20, tensile strength 140 to 200 kPa.

Acceptable Products: Or Approved Equal

Sternson	'Backer Rod'
Industrial Thermo Polymers	'Backer Rod'

.3 **Extruded Tubing:** Polyvinyl chloride or neoprene; with 6 mm ($^1/_4$") minimum thick walls.

.4 **Bond Breaker:** Pressure sensitive plastic tape.

Acceptable Products: Or Approved Equal

3M Ltd.	'No. 266 or No. 481'

.5 **Sealants:**

.1 **Sealant for vertical and horizontal non-traffic bearing joints:**

.1 Dry conditions, normal temperature range, movement range to 25 percent: to CAN/CGSB-19.18-M87, 'Sealing Compound, One Component, Silicone Base, Solvent Curing'.

.2 Dry conditions, low temperature range, movement range to 25 percent: to CAN/CGSB-19.13-M87, 'Sealing Compound, One Component, Elastomeric Chemical Curing'.

.3 Wet conditions, normal or low temperature range, movement range to 25 percent: to CAN/CGSB-19.24-M90, 'Sealing Compound, Multi-Component Chemical Curing'.

.2 **Acoustic sealant:** to CAN/CGSB-19.21-M87, 'Sealing and bedding Compound, Acoustical'.

Acceptable Manufacturers: Or Approved Equal
CGE Construction Sealants
Dow Corning Construction Sealants
Hilti
Mono
Tremco

.6 **Foam Insulating Sealant:** Two component rigid polyurethane foam in nozzle or pressure-applicator to CAN/CGSB-51.23-92, 'Spray-Applied Rigid Polyurethane Cellular Plastic Thermal Insulation'.

Acceptable Products: Or Approved Equal

Insta-Foam	'Froth Pak'.
Mono	'Instant Foam'

.7 **Joint Cleaner:** Xylol, methylethyleketone, toluol or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

.8 **Colours:** To match adjacent surfaces or clear as directed by the Architect.

PART 3 - EXECUTION

3.1 Preliminary Work

.1 Give at least [5] days notice to the Architect before starting work.

3.2 Location

.1 Seal with sealant at the junction of the following **exterior** finishing materials, unless sealant is specified to be included in the work of other sections.

.1 Concrete to concrete (including external joints of precast concrete).
.2 Concrete to metal.
.3 Concrete to masonry.
.4 Masonry to metal
.5 Masonry to masonry.
.6 Metal to metal.
.7 Metal to wood.
.8 Wood to Wood.
.9 Wood to Masonry
.10 Wood to concrete.

.2 Seal at the junction of the following **interior** finishing materials unless sealant is specified to be included in the work of other sections:

.1 Concrete to concrete.
.2 Concrete to metal.
.3 Concrete to masonry.
.4 Masonry to metal.
.5 Masonry to masonry.
.6 Metal to metal.
.7 Gypsum Board to existing surfaces.
.8 Metal to gypsum board.

.3 Install pre-molded joint fillers in accordance with manufacturer's instructions, working in close co-operation with waterproofing trades.

.4 Seal joints from face to exposed surface.

3.3 Inspection

.1 Ensure joints to receive sealant are properly prepared.

.2 Ensure surfaces to be caulked are sound, dry, free from dirt, water, frost, loose materials, corrosion, paint and other foreign matter.

.3 Inspect joint sizes and correct to achieve depth ratio of $^1/_2$ joint width with minimum width and depth of 6 mm ($^1/_2$") and maximum width of 20 mm ($^3/_4$").

.4 Commence sealing work only after joint surfaces have been inspected and approved by the Architect. For projects with unusual or complicated caulking conditions, the Architect may require the sealant manufacturer’s

representative to visit site to discuss installation procedures with the contractor.

3.4 **Preparation**

.1 Before starting sealing, test materials for indications of staining or poor adhesion.

.2 Commence sealing on masonry only after mortar has cured.

.3 Remove all dust, dirt, other foreign matter and existing sealant and backer materials. Allow joint surfaces to dry thoroughly.

.4 Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sandblasting.

.5 Remove oil, grease and other coatings from non-ferrous metals with joint cleaner.

.6 Prepare concrete, masonry, glazed and vitreous surfaces to sealant manufacturers instructions.

.7 Install joint filler to achieve correct joint depth.

.8 Where necessary to prevent staining, mask adjacent surfaces prior to priming and sealing.

.9 Apply bond breaker tape where required to manufacturers instructions.

.10 Prime sides of joints in accordance with sealant manufacturers instructions immediately prior to sealing.

.11 Do not exceed shelf life and pot life of the materials and installation times as marked on the containers.

.12 For two part materials, mix sealants thoroughly with a mechanical mixer, capable of mixing at 80-100 rpm without mixing air into materials. Continue mixing until the material is of uniform colour and free from streaks of unmixed components.

3.5 **Application**

.1 Apply sealants and joint primers to manufacturers instructions. Apply sealant using gun with proper size nozzle. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.

.2 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities. Neatly tool surface to a slight concave profile.

.3 In masonry cavity construction, vent sealed joints from cavity to 3 mm ($^1/_8$") beyond external face of wall by inserting vent tubing at bottom of

each joint and maximum of 1500 mm (5ft) OC vertically. Position tube to drain to exterior.

.4 Ensure that the correct sealant depth is maintained. The following chart is a guide for providing effective width-to-depth ratios for specified sealant:

JOINT WIDTH	**JOINT DEPTH**	
	Minimum	Maximum
6 mm ($^1/_4$")	3 mm ($^1/_8$")	
6 mm-13 mm ($^1/_4$"-$^1/_2$")	One half width	Equal to width
13 mm-25 mm ($^1/_2$"-1")	One half width	Equal to width
Over 25 mm (1")	As reviewed by Architect	

.5 Cut out damaged sealant unacceptable to the Architect; reprepare and prime joints and install new materials as directed.

3.6 Protection

.1 Provide wood planks or other approved, non-staining means of protection for the completed sealant installations where required to protect work from mechanical, thermal, chemical and other damage by other construction operations and traffic.

.2 Maintain protection securely in place until project completion. Remove protection when directed by the Architect.

3.7 Clean-up

.1 Clean adjacent surfaces immediately.

.2 Remove excess sealant and droppings using recommended cleaners as work progresses.

.3 Remove masking after tooling of joints. Remove materials installed for protection. Wash and leave work neat and clean.

-End-

PART 1 – GENERAL

1.1 General

.1 All conditions of the Contract and Division 1 apply to this Section.

.2 This Section specifies general requirements and procedures for sealants. Additional requirements may be specified in individual sections of the specifications.

1.2 Related Work

.2

Section 07510	Bituminous Roofing
Section 07620	Metal Flashing and Trim (Roofing)
Section 07900	Roofing Sealants
Section 15000	Mechanical
Section 16000	Electrical

1.3 Reference Standards

.1 CSA/CGSB 37.29 – M89 Rubber Asphalt Sealing Compound.

.2 CAN/CGSB 19.13 – M87 Sealing Compound, One Component, Elastomeric, Chemical Curing; Urethanes, one part, non-sag, (Type 2); silicones, one part Elastomeric Joint Sealants.

1.4 Supervision and Qualifications

.1 Provide a competent Foreman to supervise all work and act as the Contractor's representative unless otherwise designated.

.2 Employ only experienced and qualified workmen and ensure that workmanship conforms to the best standard practices. Replace all work that results from inferior products or workmanship.

1.5 Coordination

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

.2 Refer to Section 07510, paragraph 1.4.2.

1.6 Summary of Work

.1 Supply all labour, materials, plant and equipment necessary for the application of sealant to the full extent of the Drawings, Specifications and Details.

.2 Install Type B sealant in all "S" lock joints in sheet metal flashings, joints of raised lock seams, soil pipes, rain collars and specified sealant at all other locations where sealants are required by reference or implications but are not necessarily specified but are required to provide a complete and finished system.

.3 Work of this Section includes cutting of reglet joints required by the drawings, if not completed under other Sections.

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

1.7 Examination

.1 Do not commence work until surface to be covered has been inspected.

.2 Inspect work and advise the Consultant of conditions that would adversely affect the work of this trade.

.3 Adjacent Construction and installation of related work is incorporated and complete.

.4 Commencement of work is proof that the Contractor has accepted surfaces as satisfactory for intended operations and accepts responsibility for appearances and performance of completed work.

.5 Repair damage and inferior work caused by work of this Section with materials and finish to match the original to the Consultant's approval.

1.8 Submittals

.1 Submit to the Consultant a list of materials and Manufacturer's colour charts intended for use before they are ordered and in accordance with Section 07521.

1.9 Samples

.1 Submit samples in accordance with Section 07510.

1.10 Mock-ups

.1 Construct mock-ups in accordance with Section 07510.

.2 Before proceeding with fabrication submit samples and provide a 1200mm (4'-0") mock-up of all joints to be sealed showing size, shape, depth of joint, back-up material, primer and sealant. Mock-up may be part of finished work.

.3 Allow 48 hours for inspection of mock-up by the Consultant before proceeding with sealant work.

1.11 Delivery, Storage and Handling

.1 Deliver and store materials in original wrappings and containers with Manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.12 Environmental and Safety Requirements

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada.

.2 Conform to Manufacturer's recommended temperatures, relative humidity and substrate moisture content for application and curing of sealants including special conditions governing use.

.3 In confined spaces provide portable supply of outside air and exhaust fans to ensure fumes will not impact workmen or building occupants.

.4 Compatibility is essential in use of any materials that will be compatible when incorporated in finished assembly.

PART 2 – PRODUCTS

2.1 Materials

.1 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers, use only these primers.

.2 Type:

B Caulk: One part Polyurethane compound; For concealed horizontal sheet metal, joints, reglets and exterior uses; to CAN/CGSB 2-19.13 (M87), Elastomeric Joint Sealants.

Dymonic by Tremco

Sonolastic NP1, Ultra by Sonneborn

C Modified Sealant: For termination, extent or fasteners into modified membrane flashings; to CAN/CGSB 37.5-M89, ASTM 4586.

Sopramastic 200 by Soprema

MBR Flashing Cement by Johns Manville

D Mastic: For underside of metal flanges, temporary seals on felts, pitchbox filler; to CAN/CGSB 37.29.

Polybitume 570-05 by Bakor

MBR Flashing Cement by Johns Manville

.3 Primer: As recommended by Sealant Manufacturer.

.4 Polyethylene Rod: Extruded polyethylene, closed cell shore A Hardness 20, tensile strength 140 to 210 kilopascals. Oversize 30% to 108%.

.5 Bond Breaker Tape: Polyethylene Bond Breaker Tape which will not bond to caulking as recommended by Manufacturer.

.6 Use butyl acoustical sealant for sealing "S" lock of metal flashing.

2.2 Joint Cleaner

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant Manufacturer.

PART 3 - EXECUTION

3.1 Protection

.1 Protect installed work of other trades from staining or contamination.

3.2 Preparation of Joint Surfaces

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

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

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with Manufacturer's directions.

3.3 Priming

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

.2 Prime sides of joints in accordance with sealant Manufacturer's instructions immediately prior to caulking.

3.4 Back-up Material

.1 Apply bond breaker tape where required to Manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 Mixing

.1 Mix materials in strict accordance with sealant Manufacturer's instructions.

3.6 Application

.1 Sealant Type **B**.

1. Apply sealant when air and substrate temperatures are not forecast to be less than minimum recommended by Manufacturer. Do not work during inclement weather. Perform all work in accordance with Manufacturer's written instructions.

2. Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
3. Apply sealant in continuous beads.
4. Apply sealant using gun with proper size nozzle.
5. Use sufficient pressure to fill voids and joints solid.
6. Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets and embedded impurities.
7. Tool exposed surfaces before skinning begins to give slightly concave shape.
8. Remove excess compound promptly as work progresses and upon completion.
9. Curing.
   - .1 Cure sealants in accordance with sealant Manufacturer's instructions.
   - .2 Do not cover up sealants until proper curing has taken place.
10. Cleanup.
    - .1 Clean adjacent surfaces immediately and leave work neat and clean.
    - .2 Remove excess droppings using recommended cleaners as work progresses.
    - .3 Remove masking taper after initial set of sealant.
    - .4 Clean all contaminated surfaces to Owner's acceptance.
    - .5 Remove all rubbish and surplus materials from the job site on a daily basis.

.2 Sealant Type **C**

1. Install modified sealant to the top of membrane flashings where required or as shown on drawings. Modified sealant to be installed around finished flashings at all protrusions including soil stacks, sleeves, pitch boxes and fasteners securing membrane to walls.
2. Apply modified sealant with hand trowel to achieve a 25mm (1.0") width and minimum 3mm (0.125) thickness.
3. Apply modified sealant immediately after flashings have been installed and are still warm. No membrane flashings shall be left uncovered at the end of any work period. *(Non-compliance with this mandate may result in rejection, removal and replacement of the membrane flashings to the affected area).*
4. Trowel modified sealant in two directions to ensure proper adhesion to substrate and that all surface irregularities are filled. Tool surface of modified sealant to smooth finish.

.3 Sealant Type **D**

1. Install mastic at the underside of drains, metal sleeves and other location where specified on drawings.
2. Install mastic to fill the top 38mm (1.5") of pitch boxes. Trowel top of mastic to smooth finish, providing a minimum 8% slope away from the projection on all sides.
3. When modified membrane flashings are not to be completed in the same work period, neatly cut ends of the Fibreglass felts in a straight line at the top of the cant strip after the glaze coating has been applied. Trowel a continuous bead of mastic 50mm wide at the termination of felts to provide a temporary waterproofing seal. Additionally, install mastic at all fishmouths and corners as required.

3.7 Review Of The Contractor Work

.1 Field review of the Contractor's work shall be completed in accordance with Section 07510.

3.8 Non-compliance With Inspection and Testing

.1 The correction of work shown to be in Non-compliance with inspection and testing shall be completed in accordance with Section 07510.

3.9 Warrantee

.1 The work of this Section shall be included in the Warrantee as specified for Section 07510.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment to provide rated labelled and unrated steel doors, insulated metal panels and frames complete, as shown on the drawings, described herein, or as necessary to complete the work.

1.2 Related Work Under Other Sections

.1 Section 04211: Basic Unit Masonry, [co-ordinating with work of this section.]

.2 Section 06100: Rough Carpentry, [co-ordinating with work of this section.]

.3 Section 06200: Finish Carpentry, [co-ordinating with work of this section and provide all steel doors for installation.]

.4 Section 07900: Sealants, [co-ordinating with work of this section.]

.5 Section 08711: Hardware, [install work of this section.]

.6 Section 09900: Basic Painting, [co-ordinating with work of this section.]

1.3 Standards

.1 **Welding:** To CSA-W59-M1989.

.2 Perform work of this section in accordance with requirements of Canadian Manufacturing Specifications for Steel Door and Frames, latest version of Canadian Steel Door and Frame Manufacturers' Association (CSDFMA) standard, except as otherwise specified herein.

1.4 Delivery, Storage and Handling

.1 Carefully handle doors, frames and screens to preclude any disfigurement, twisting or marking.

.2 Store frames on supports such that a minimum clearance of 100 mm (4") is maintained between underside of metal and ground or floor. Prevent moisture damage.

.3 Cover doors and frames in an approved manner to protect from inclement weather, water and damage.

.4 Cover all prefinished steel surfaces with protective masking.

1.5 Co-ordination and Co-operation

.1 Co-ordinate and co-operate with all other trades to ensure satisfactory and expeditious completion of the work.

1.6 **Shop Drawings**

.1 Submit [6] copies of shop drawings clearly indicating each door frame screen material, core thickness, reinforcements, glazing, type, profiles location of exposed fasteners and arrangement of hardware, etc.

.2 Include schedule identifying each unit with door marks and number relating to numbering on drawings and in door schedule.

.3 Show all door swings.

PART 2 - PRODUCTS

2.1 **Materials**

.1 **Sheet Steel:** Cold rolled, commercial grade, to ASTM A526/A526 M85 with zinc finish. Interior ZF001 and Exterior G90.

.2 Minimum thickness for sheet steel components shall be in accordance with CSDFMA Specifications except as follows:

		GAUGE NO.	EQUIVALENT THICKNESS
.1	Frames & closures angles.	16	1.5 mm (0.0598")
.2	Frames for openings larger than 1200 x 2184 mm (4'-0"x7'-2").	14	1.9 mm (0.0747")
.3	Frame reinforcement & extension channels.	14	1.9 mm (0.0747")
.4	Doors and metal panels.		
	Surface sheets	16	1.5 mm (0.0598")
	Surface sheets for doors greater than 1200 x 2184 mm (4'-0" x 7"x2")	16	1.5 mm (0.0598")

.5 Metal jamb anchors occurring in exterior walls shall be fabricated from galvanized sheet steel having zinc coating designation Z275 to ASTM A5250-77, 3 per frame minimum.

.2 **Core**

.1 In addition to CSDFMA specifications, interior rated doors; resin impregnated pre-expanded Kraft honeycomb core, and semi-rigid glass fibre insulation at 0.04 kg/m^3 (3 ld/ft^3) to requirements of CSA-A101-M1983, Type 1 is acceptable. Maximum opening of honeycomb shall be 19 mm ($^3/_4$").

.2 Exterior doors and metal panels; self-extinguishing foamed-in-place urethane foam only for 1-3/4" doors and metal panels and glass fibre for frames.

.3 Sound rated doors; sufficient density to provide satisfactory structural support and sound reduction characteristics of 32 decibels at average frequencies of 125 to 4,000.

.3 **Door Bumpers:** To manufacturers requirements of colour selected.

.4 **Primer:** Zinc rich primer conforming to CGSB-1-GP-181M.

.5 **Panel Fasteners:** Concealed fasteners of approved hot dip galvanized steel, type to provide accurate, secure installation.

.6 **Metal Filler:** Two component epoxy type.

.7 **Phosphatizing:** To CGSB-31-GP-105Ma.

.8 **Accessories:** Guard boxes, tie anchors, hinges, strikes, reinforcing, spreaders, finishing hardware, glazing stops, etc. of approved manufacturers.

2.2 **Welding**

.1 Ensure welds are continuous, free from inclusions, porosity, lack of fusion penetration, uneven contour, undercuts and cracks. Remove weld spatter on expose surfaces. **NOTE: Continuously weld all seams and joints, grind smooth flush, dress and fill.**

2.3 **Fabrication (frames)**

.1 Form profiles accurately to details indicated. All frames shall have mitred and welded corners. Knock down frames are unacceptable for this project.

.2 Prepare for hardware using approved templates.

.3 Reinforce all door frames for closers.

.4 Fill all exposed surface depressions and all joints resulting from fabrication of frames with metallic filler and sand to a smooth, uniform finish.

.5 Prepare each door frame for bumpers unless indicated otherwise. Provide and install 3 bumpers on strike jamb of each single leaf door frame and 2 bumpers on head of double leaf door frame.

.6 Ship each frame complete with easily removable metal channel or angle shaped spreaders.

.7 Terminate all door frames at top concrete slab. Provide floor plates for anchorage of slab.

.8 Provide jamb/mullion extension/reinforcement channels for each jamb and mullion in metal stud partitions extending to underside of structure with approved provision for vertical adjustment.

.9 Reinforce door heads for frames with door openings exceeding width of 1500 mm (5'-0"). Weld all reinforcement to frame in an approved manner to realize total strength potential.

.10 Provide frames with integral base at locations indicated.

.11 Make allowance for deflection to ensure structural loads are not transmitted to frames.

.12 Use thermally broken and insulated frames to exterior doors.

2.4 **Fabrication (slab doors and panels)**

.1 Construction all doors and panels of flush type hollow steel construction or honeycomb core construction. Form each face from a single sheet of metal. **NOTE: Continuously weld all seams and joints, grind smooth flush, dress and fill.**

.2 Reinforce doors to ensure that the maximum corner-to-corner racking of doors does not exceed 1.5 mm ($^1/_{16}$").

.3 Prepare doors for hardware as per frame requirements. Where pairs of doors occur, prepare meeting edge to receive integral astragal. Refer to Hardware Schedule for removable mullions, astragals and the like for fire rated doors.

.4 Bevel strike edges of doors 1.5 mm ($^1/_{16}$") maximum.

.5 Provide continuous metal closure at top of doors flush with edges of exposed surfaces. Provide continuous metal closure at bottom of doors.

.6 Clean doors of all deleterious substances and contaminants, sand, flood coat with air drying paste filler, and again sand to eliminate all unevenness or irregularities including dimpling resulting from welding.

PART 3 - EXECUTION

3.1 **Installation:** Provide doors, frames and screens to appropriate section as listed in 1.2 above for installation with 3 anchors minimum per frame.

3.2 **Clean-up**

.1 After inspection and acceptance, remove manufacturers labels, clean and polish, ready for painting under Section 09900.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Conditions.

.2 This section is used as a control of the hardware and for the provision of dimensional information and all other requirements necessary for the installation of the finish hardware.

1.2 Related Work Under Other Sections

.1 Section 06200: Finish Carpentry, [provide all finish hardware to this section for installation.]

1.3 Standards

.1 Hardware must be listed on the CAN/CGSB-'69' series 'Qualified Products List' and ANSI/BHMA 'A' Series, except interior use door closers and National Builders' Hardware Association (NBHA).

.2 Locate and install door hardware to the Canadian Steel Door and Frame Manufacturers Association Standard 'Canadian Metric Guide', unless otherwise detailed.

.3 Use only one manufacturer for similar products.

1.4 Delivery, Storage and Handling

.1 Deliver each item of hardware packaged separately in original individual containers, with necessary screws, keys, instructions and installation templates. Mark each container with item number show on list.

.2 Be responsible for arranging delivery time and date to site, or door manufacturer, of all hardware so that all work may progress without delay or interruptions.

.3 Hardware supplier and hardware installer together shall check, in detail, hardware delivered to site to prevent discrepancies, shortages or omissions.

.4 Storage and protection of hardware is responsibility of the general Contractor and/or installer.

.5 Any loss or damage shall be the Contractor's sole responsibility. Exercise close control over handling of hardware particularly the distribution of keys.

1.5 Maintenance Data

.1 Provide maintenance data, parts list, manufacturer's instructions for each type of door closer, lockset, door holder, and panic hardware.

.2 Provide (2) sets of wrenches for door closers and locksets.

.3 Brief Owner's maintenance staff regarding proper care of hardware such as lubrication of locksets, and adjustments of door closers, cleaning and general maintenance.

1.6 **Certification and Warranty**

.1 Hardware supplier shall inspect operation of all installed hardware. Upon completion of this inspection, present a list of deficiencies to General Contractor for correction. Forward copies of deficiency list to Owner and Consultant.

.2 On completion of finish hardware installation, and after rectification of deficiencies, submit to Finish Hardware Consultant written certification that all materials are accounted for, correctly installed and functioning normally.

.3 Submit a written warranty, in accordance with Division covering replacement of defective door closers for a period of four years from the expiration of the standard one year warranty. Total warranty period of (5) years.

1.7 **Co-ordination**

.1 Before furnishing any hardware, check all drawings and specifications for hardware requirements, verify door swings, check all shop drawings with frame and door schedules and advise Architect in writing of any discrepancies noted.

PART 2 - PRODUCTS

2.1 **Finish Hardware** See Hardware Schedule.

PART 3 - EXECUTION

3.1 **Installation**

.1 All installation to manufacturers recommendations.

3.2 **Templates**

.1 Provide timely lists of materials complete with setting diagrams, dimensions and sizes to all concerned.

.2 Use template hardware for hollow metal doors and frames.

.3 Provide necessary templates for preparation of doors and frames.

3.3 **Installation, Heights and Requirements**

.1 Hinges: 3 per door for doors less than 2130 mm (7'-0") in height. 4 per door for doors over 2130 mm (7'-0") in height.

.2 Deadlock Strikes: 1260 mm ($49^1/_2$") form finished floor.

.3 Mortise Strikes: 980 mm ($38^1/_2$") form finished floor.

.4 Backset for Locksets: 70 mm ($2^3/_4$").

.5 Push Plates and Door Pulls: 1066 mm (42") from finished floor.

.6 Deadlocks: 1250 mm (50") from finished floor.

.7 Exit Device Cross Bar: 990 mm (39") from finished floor.

.8 Door Closers and Door Holders: Degree of opening to be 90 degrees unless noted otherwise.

.9 All installation heights to meet A.N.S.I. requirements and be approved by Finish Hardware Consultants.

3.4 **Clean and Adjust**

.1 Upon completion of finish hardware installation adjust for smooth silent secure operation.

.2 Clean and polish finish hardware and adjacent surfaces ready for use.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for the installation of steel stud wall and ceiling framing and accessories as shown on the drawings, described herein or as necessary to complete the work.

1.2 Related Work Under Other Sections

.1 Section 06100: Rough Carpentry, [provide and install wood blocking.]

.2 Section 09250: Gypsum Board, [co-ordinating work with this section.]

1.3 Standards

.1 Steel Stud Framing to National Association of Architectural Metal Manufacturers [NAAMM] standards.

.2 Anchor bolts to CAN/CSA-G40.21-M87.

.3 Welding to CSA -W47.1-1983 and CSA -W59-M1989.

.5 Shop finish sections with hot dip galvanizing to ASTM A525-87.

.6 Sizes and spacings to carry live, dead and dynamic loadings with a maximum deflection of l/360 of the clear spans.

PART 2 - PRODUCTS

2.1 Channel Studs: To ASTM C645-83, roll-formed galvanized steel to size and thickness required for spans and spacings and as detailed on drawings; knock-out service holes 460 mm (18") oc; matching floor and ceiling snap-in tracks to suit stud sizes; channel stiffeners to manufacturers standards. **Use 20 gauge material for studs with abuse resistant gypsum wallboard.**

2.2 Metal Furring and Suspension Systems: To Section 09250: Gypsum Board, Paragraph 2.2.

2.3 Isolating Strips: Rubberized, moisture resistant, 3 mm ($^1/_8$") thick cork strip 12 mm ($^1/_2$") wide with self-stick adhesive.

2.4 Acoustical Sealant: To CAN/CGSB-19.21-M87; Sealing and Bedding Compound for Acoustical Purposes.

2.5 Anchors: Floor, wall, ceiling and others of type, size and spacing to manufacturers standards.

2.6 Framing Screws: Galvanized, power driven screws. Type, size and spacing to manufacturers standards.

2.7 Sound Attenuation Insulation: Provided by Section 07214; Fibre Insulation.

PART 3 - EXECUTION

3.1 Preliminary Work

.1 Give at least [5] days notice to the Architect before starting work.

3.2 Installation-General

.1 Install in accordance with NAAMM standards.

.2 Install continuous separation strips to isolate steel tracks and studs from any uninsulated surface.

.3 Align floor and ceiling tracks; anchor 600 mm (2 ft) oc.

.4 Accurately cut steel studs to provide necessary head expansion joint and snap into track. Ensure full floor track contact and uniform ceiling track clearances to accommodate structural shrinkage.

.5 Install opening headers, double studs at opening jambs, triple studs at corners, bridging and cross bracing as required. Ensure service hole openings are aligned.

.6 Carefully adjust studding within a tolerance of 1:1000 and secure elements except ceiling track connections with screws. Secure ceiling track connections by crimping and to manufacturer's directions.

.7 Install necessary back-up headers and/or knee studs for attachment of fixtures [i.e. lavatories, WCs, bathroom fixtures, plumbing hardware, grab bars, towel rails, cabinet work, electrical boxes, etc].

.8 Install two continuous beads of acoustical sealant at floor and ceiling track prior to installing wall panels.

.9 Co-operate with other Sections by supplying and installing additional accessories as required together with back-up framing or access holes.

3.3 Sound Attenuation Partitions

.1 Install sound attenuation partitions where shown on drawings. Install sound attenuation insulation in partitions so indicated by filling all voids with batts.

.2 Maintain air space between backs of blankets and back of opposite face layer.

.3 Pack blankets tightly against ducts, conduits and services passing through attenuation barriers.

.4 **Extend sound rated partition to underside of structure**. Incorporate approved provision to obviate transmittance of structural deflection to partition assembly.

.5 Do not make fastenings of studs or runners to columns. Install independent self-supporting partitions at all columns. Support partitions from structural floor and underside of structure.

.6 Cope gypsum board by section 09250 neatly to profile of structural components providing between 8 mm ($^5/_{16}$") and 6 mm ($^1/_2$") clear space between edge of gypsum board and surface of structural members.

.7 Apply a continuous 8 mm ($^5/_{16}$") bead acoustical sealant of compressible filler strips to perimeter edges of each face sheet of partitions, including areas above suspended ceiling.

.8 Apply a 6 mm ($^1/_4$") bead around all cutouts including electrical switch and plug outlets, butter back and sides of all outlets boxes with sealant, and any other opening in the partition that permits sound transmission.

.9 Apply sealant to clean, dry surfaces free of dust and other foreign matter.

3.4 **Suspended and Furred Ceilings:** To Section 09250: Gypsum Board, Paragraph 3.3.

3.5 **Metal Furring (Attachment to Masonry or Concrete Walls):** To Section 09250 Gypsum Board, Paragraph 3.4.

3.6 **Resilient Furring:** To Section 09250: Gypsum Board, Paragraph 3.5.

3.7 **Clean-up**

.1 Clear away waste materials and debris and leave premises 'broom clean`.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for the installation of gypsum board shown on the drawings, described herein, or as necessary to complete the work.

1.2 Related Work Under Other Sections

.1 Section 06200: Finish Carpentry, [provide and install all gypsum board and trims.]

.2 Section 09900: Basic Painting, [co-ordinating with work of this section.]

.3 Division 15: Mechanical, [install all access panels to be provided by this Division and co-ordinate all grilles.]

.4 Division 16: Electrical, [co-ordination of all recessed fixtures and valance grilles]

1.3 Standards

.1 Comply with Residential Standards, Section 30, Ontario Building Code, Parts 3 and 9 and CAN/CSA-A82.27-M1977 + Amdt. 1985 'Gypsum Board Products'. Carry out work in accordance with CSA-A82.31-M1980 'Gypsum Board Applications', except where specified otherwise.

.2 Construct fire rated ceilings/walls to provide required ULC approved fire ratings. Submit written proof of compliance with ULC design.

.3 Ensure sound rated construction meets approved tables in building codes or have STC rating tested in accordance with ASTM E90-85.

1.4 Inspection

.1 Examine underlying and adjoining work and remove or repair defects liable to impair the results of the work.

.2 Apply gypsum board after inspection and approval by the Architect of electrical and mechanical work behind or above this finish.

1.5 **Delivery, Storage and Handling**

.1 Deliver and store materials undamaged in original wrappings and bundles.

.2 Store materials in a dry weatherproof enclosure.

.3 Store gypsum board flat, in piles without overhanging boards.

1.6 **Environmental Requirements**

.1 Ensure temperature of surrounding areas is minimum 10 degrees C and maximum 21 degrees C, 24 hours before installation and until joint filler has dried. Avoid concentrated or irregular heating.

.2 Provide adequate ventilation to eliminate excessive moisture before commencing and during the work to ensure proper drying of joint filler and adhesive. Do not force dry adhesive and joint treatment.

1.7 **Co-ordination and Co-operation**

.1 Co-ordinate and co-operate with all other trades to ensure satisfactory and expeditious completion of the work.

PART 2 - PRODUCTS

2.1 **Gypsum Board:**

.1 **Abuse Resistant:** To CAN/CSA-A82.27-M77 + Amdt. 1985, standard type, minimum 15.9 mm ($^5/_8$") thick or as indicated on drawings. **In all areas other than fire rated partitions.**

.2 **Moisture and Mould Resistant:** To CAN/CSA-A82.27-M77 + Amdt. 1985, standard type, minimum 15.9 mm ($^5/_8$") thick or as indicated on drawings. **In all washroom areas other than fire rated partitions.** 'Humitek' or equal.

.3 **Fire Rated Abuse Resistant:** To CAN/CSA-A82.27-M77 + Amdt. 1985, fireguard type X (1) hour rated, minimum 15.9 mm ($^5/_8$") thick.

Accepted manufacturers: Or Approved Equal
U.S.G
C.G.C.
Domtar
Westroc

.4 **Acoustical:** To ASTM D3273, type X, minimum 15.9 mm ($^5/_8$") thick STC min 50 as indicated on drawings.

Accepted manufacturers: Or Approved Equal

Certainteed	'Silent FX'
Acoustical Surfaces Inc. (1-800-448-0121)	'Sound Break XP'

2.2 **Concrete Backer Board:**

.1 **Concrete Backer:** To CAN/CSA-A82.27-M77 + Amdt. 1985, standard type, minimum 12.7 mm ($^1/_2$") thick or as indicated on drawings. **In all areas other than fire rated partitions.**

Accepted manufacturers: Or Approved Equal

USG	'Durock'
Custom Building Products	'Wonderboard
Or Equal	

2.3 **Metal Furring and Suspension Systems:**

.1 **Steel Studs:** To ASTM C645-83, roll formed to sizes and thicknesses required for spans and spacings, with knock-out service holes 460 mm (18") oc, complete with matching floor and ceiling snap-in tracks to suit stud sizes and channel stiffeners to manufacturers directions. **Use 20 gauge material for all studs.**

.2 **Metal Furring Runners, 12.7 mm ($^1/_2$") Resilient Furring Channels, Hangers, Tie Wires, Inserts, Anchors:** To CAN/CSA A82.30-M80, galvanized type.

.3 **Drywall Furring Channels:** 20 gauge thickness galvanized steel channels for gypsum board screw attachment.

.4 **Resilient Clips:** 0.5 mm (0.02") thick galvanized steel for gypsum board resilient attachment.

2.4 **Fastenings and Adhesives:**

.1 **Nails, Screws and Staples:** To CAN/CSA-A82.31-M1980, galvanized.

.2 **Stud Adhesive:** To CAN/CGSB-71.25-M88.

.3 **Laminating Compound:** To CAN/CSA-A82.31-M80 asbestos free. Mix to manufacturers specifications, apply to wallboard with applicator producing 6 mm ($^1/_4$") diameter threads and spread 50 mm (2") oc.

2.5 **Accessories:**

.1 **Coping Beads:** 12 mm ($^1/_2$") or 16 mm ($^5/_8$") to suit gypsum board thickness, 0.6 mm galvanized steel of G90 zinc finish to ASTM A525/A525 M-87, perforated flanges, one piece length per location. Use type designed to be concealed in finished work with joint tape and joint compound.

.2 **Corner Beads:** 0.6 mm galvanized steel 25 x 25 mm (1"x1") and 32 x 32 mm ($1^1/_4$"x$1^1/_4$") for gypsum board over 12.7 mm ($^1/_2$") thick; 2400 mm (4 ft) length; G90 zinc finish to ASTM A525/A525-M87; perforated flanges; one piece length per location.

.3 **Reveal Trims** 'D-800' gypsum board reveal trim for 12.7 mm ($^1/_2$") and 15.9 ($^5/_8$") thick board and 12.7 mm ($^1/_2$") reveal dimension.

.4 **Edge Trims:** 'D-200' gypsum board edge trim for 12.7 mm ($^1/_2$") and 15.9 ($^5/_8$") board.

.5 **Acoustic Sealants:** To CAN/CGSB-19.21-M87.

.6 **Insulating Strip and Pads:** Rubberized 3 mm ($^1/_8$") thick closed cell moisture resistant neoprene strip, 12 mm ($^1/_2$") wide; self adhesive one face; length as required.

Acceptable Manufacturers
Bailey Metal Products Limited

.7 **Metal Fire Rated Access Panels:** Provide new 300mm x300mm (12" x 12") min. or size to suit existing size, access panel for drywall application (2hr min) c/w hex head cam latch location as shown on drawings.

Acceptable Manufacturers: Or Approved Equal

Cendrex (1-800-479-1489)	PFN-GYP
Accudor	FB-5060

PART 3 - EXECUTION

3.1 Preliminary Work

.1 Give at least [5] days notice to the Architect before starting work.

3.2 General

.1 Installation in accordance with manufacturers printed directions.

.2 Employ only skilled labour.

.3 Where vapour barrier continues over metal furring members, ensure installation of insulation, vapour barrier and perimeter seals are complete before applying gypsum board finish.

.4 Co-ordinate this work with other trades to ensure proper location of hangers, carrying channels and furring channels required for installing flush mounted light fixtures, outlet boxes, diffusers, fittings, equipment units and associated material. Rectify installation errors at no additional cost.

3.3 Suspended and Furred Ceilings

.1 Space hangers not exceeding 1200 mm (4 ft) oc each way and in rows parallel to walls. Area between hangers must not exceed 1.5 m^2. Do not secure hangers to pipes, ducts and electrical or mechanical items.

.2 Erect hangers and runner channels for suspended gypsum board ceiling in accordance with CAN/CSA-A82.31-M1980 except where specified otherwise.

.3 Support light fixtures using additional hangers within 150 mm (6") of each corner and maximum 600 mm (2 ft) around perimeter of fixture.

.4 Install work level, to 1:1000 tolerance.

.5 Provide additional hangers, as required, to support weight of installed equipment; frame with furring channels at perimeter of openings for access panels, light fixtures, diffusers, grilles and other built-in items.

.6 Install 19 x 64 mm ($^3/_4$"x2$^1/_2$") furring channels parallel to and at 600 mm (2 ft) oc with furring clips or double strand of wire.

.7 Furr for gypsum board faced vertical bulkheads within or at termination of ceilings.

.8 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas where indicated.

3.4 **Metal Furring - Attachment to Masonry or Concrete Walls**

.1 Install furring for gypsum board finishes to CAN/CSA-A82.31-M1980 except where specified otherwise.

.2 Frame openings and around built-in equipment, cabinets and access panels on four sides. Extend furring into reveals. Check clearances with equipment supplier.

.3 Furr duct shafts, beams, columns, pipes and exposed services where required.

3.5 **Resilient Furring**

.1 Erect drywall resilient furring transversely across studs/joists spaced maximum 600 mm (2 ft) OC and not more than 150 mm (6") from ceiling/wall juncture. Secure to each support with [38 mm (1$^1/_2$") common nail] [25 mm (1") drywall screw].

.2 Install 150 mm (6") continuous strip of [12.7 ($^1/_2$")] [15.9 ($^5/_8$")] mm gypsum board along base of partition/partywalls where resilient furring is installed.

3.6 **Gypsum Board Application**

.1 Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical works are approved.

.2 Take measurements accurately.

.3 Erect gypsum board vertically or horizontally whichever results in fewer end joints. Butt joints loosely with 6 mm ($^1/_4$") maximum gap. Do not force board into position. Ensure end joints occur over framing.

.4 Where shown on drawings, laminate gypsum board to concrete or concrete block masonry only when the base is dry, clean and free from dirt or efflorescence. Mix adhesive according to manufacturers directions. Apply adhesive with a notched trowel leaving 10 x 12 mm ($^3/_8$"x$^1/_2$") ribbons 32 mm ($1^1/_4$") oc over entire back side of face layer. Temporarily secure gypsum board in place with concrete nails or bracing. Avoid impact or movement of boards until adhesive is firmly set.

.5 Where fastener application to furring, studs, runner channels, angles and other framing is required, use 15.9 mm ($^5/_8$") long approved screws for gypsum board up to 16 mm ($^5/_8$") thick to secure metal furring, wood furring and framing. Fasten gypsum boards maximum 25 mm (1") thick to metal angle and channel runners with 32 mm ($1^1/_4$") screws. Space screws 300 mm (12") oc in field of board and 200 mm (8") staggered along abutting edges. Start securing board centrally and work toward edges and ends. Drive screws so screw heads provide a slight depression. Do not drive screws closer than 100 mm (4") from edges or ends of gypsum board.

.6 Apply Foil backed gypsum board to soffit areas where indicated on the drawings.

.7 Use water resistant gypsum board adjacent to slop sink and where wall tiles to be installed. Use water resistant sealant at fastener heads, edges, ends and cut-outs exposing gypsum core. Do not apply joint treatment on areas to receive tile finish.

.8 Apply 12 mm ($^1/_2$") diameter bead of acoustic sealant around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abutt fixed building components. Seal perimeter of cut-outs around electrical boxes, ducts and in partitions where perimeter sealed with acoustical sealant.

3.7 **Accessories**

.1 Erect accessories straight, plumb, level, rigid and in proper plane; use full length pieces; make joints tight, properly aligned and rigidly secured; mitre and fit corners accurately, free from rough edges; secure at 150 mm (6") oc.

.2 Install casing beads around perimeter of suspended ceilings.

.3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated; use sealant at joints.

.4 To promote a thermal break, install continuous insulating strips at edges of gypsum board or casing beads abutting metal window or exterior door frames.

3.8 Control Joints

.1 Install control joints in gypsum board where board is placed over masonry control joints, at junction of dissimilar wall materials, at changes in substrate construction, at approximate 7 m (23 ft) spacing on long corridor runs in walls and ceilings and at locations indicated on the drawings.

.2 Where application is on studs, double up studs at control joints; place one stud on each side of joint; terminate runners at each side of joint.

.3 Construct control joints of two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint.

.4 Provide continuous polyethylene dust barrier behind and across control joints.

.5 Install control joints straight and true.

3.9 Expansion and Construction Joints

.1 Provide at locations where building expansion and construction joints occur and elsewhere as required.

.2 Where application is on studs, double up studs at expansion and construction joints; place one stud on each side of joint; terminate runners at each side of joint.

3.10 Access Doors

.1 Install access doors to electrical and mechanical fixtures specified in respective sections and shown on the drawings.

.2 Rigidly secure frames to furring or framing systems.

3.11 Sealing

.1 Provide perimeter sound sealing at junction of gypsum board with structure, other partitions, junction of dissimilar materials and adjacent construction; apply in concealed locations only; install in strict accordance with sealant manufacturer's instructions.

.2 Provide two beads or more as required to exceed partition rating.

.3 Seal openings around ducts and other members passing through the drywall system.

.4 Seal around ducts, frames and other locations to ensure a moisture proof installation and to the Architect's approval.

3.12 Finishing

.1 Finish face panel joints and internal angles with joint system comprising joint compound, joint tape and taping compound installed in accordance with manufacturers directions and feathered out on panel faces.

.2 Finish corner beads, control joints and trim as required with two coats joint compound and one coat taping compound, feather out to panel faces.

.3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board and to be invisible after painting completed.

.4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent board surface.

.5 Completed installation shall be smooth, level or plumb, free from waves and other defects and ready for painting.

.6 Do not treat joints of laminated gypsum board for at least 24 hours after lamination.

.7 Leave finished work smooth, seamless, plumb, true, flush and with square, plumb, neat corners and edges.

.8 Remove and make good at no extra cost any work which is defective or unsuitable and as required by the Architect.

3.13 Clean-up

.1 Vacuum clean areas of operation; wash and polish blemished surfaces ready for use. Arrange painting of new gypsum board surfaces as soon as possible after installation.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for the installation of suspension systems and lay-in acoustic ceilings shown on the drawings described herein, or as necessary to complete the work.

1.2 Related Work Under Other Sections

.1 Division 15: Mechanical [co-ordination of all ceiling grilles and difussers]

.2 Division 16: Electrical [co-ordination of all lay-in light fixtures]

1.3 Standards

.1 **Installation:** To ASTM C636-86 unless specified otherwise.

.1 **Construction:** To ASTM C635-87 unless specified otherwise.

.3 Ensure sound-rated construction meets approved tables in the building codes or have STC rating tested in accordance with ASTM E90-85.

.4 **Maximum Deflection:** 1/360th of span to ASTM C635-87deflection test.

1.4 Samples

.1 Submit duplicate copies of manufacturer's literature showing basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustic units and installation.

.2 Submit duplicate samples of each type of acoustical panel required for the project.

1.5 Environmental Conditions

.1 Permit wet trades work to dry before commencing installation.

.2 Maintain uniform minimum temperature of l5 degrees C and humidity of 20-40 percent before, during and 48 hours after installation.

.3 Store materials in work area 48 hours prior to installation.

1.6 Maintenance Materials

.1 Deliver acoustical units for maintenance of 1 full case for each pattern and type required for the project. Store where directed by the Owner and identify contents.

.2 Maintenance materials shall be from the same production run as the installed materials.

PART 2 - PRODUCTS

2.1 **Suspension Systems:**

.1 **Fabrication:** Intermediate duty system to ULC F207. Basic materials for suspension system: commercial quality cold-rolled steel mill finished.

2.2 **Tee Bar Grid Components:** Exposed shop painted satin sheen white components die cut. Main tee with double web, rectangular bulb and 25 mm (15/16") rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.

Acceptable Products: Or Approved Equal

Armstrong	'Prelude XL'

2.3 **Hanger Wire:** Galvanized soft annealed steel wire, 2.6 mm (16 ga) diameter for other ceilings.

2.4 **Hanger Inserts:** Purpose made, as detailed.

2.5 **Carrying Channels:** Galvanized steel channels; 38 x 150 x 1.2 mm ($1^1/_2$"x 6"x 18ga).

2.6 **Accessories:** Splices, wire ties, retainers and wall moulding flush or reveal to complement suspension system components, as recommended by system manufacturer.

2.7 **Acoustic Panels:**

.1 Type: Mineral Fibre Board Lay-in.

.2 Pattern: smooth, low VOC, impact resistant, washable.

.3 Flame spread rating of 25 or less class A.

.4 Noise reduction coefficient NRC designation of .50 - .60.

.5 Light reflectance range of 0.90.

.6 Ceiling plenum sound transmission range of 35 - 40.

.7 Edge Square.

.8 Colour: white.

.9 Size 600 x 1200 x 19 mm thick (24"x 48"x $^3/_4$").

.10 Shape flat.

Acceptable Products: Or Approved Equal
Armstrong School Zone Fine Fissured- 1811 fire guard'

PART 3 - EXECUTION

3.1 Preliminary Work

.1 Give at least [5] days notice to the Architect before starting work.

3.2 Suspension System

.1 Install hangers from structure.

.2 Do not install the ceiling system and panels until work above ceiling has been inspected and accepted by the Architect.

.3 Lay out [center line of ceiling both ways, to provide balanced borders at room perimeter] [with border units not less than 50 percent of standard unit width] [system according to reflected ceiling plan] [to match existing].

.4 Ensure suspension system is co-ordinated with location of related components.

.5 Install wall mould to provide correct ceiling height. Level finished ceiling to within 1:1000.

.6 Completed suspension system to support superimposed loads, such as [lighting fixtures] [diffusers] [grilles] and [speakers].

.7 Support [light fixtures] [diffusers] with additional ceiling suspension hangers within 150 mm (6") of each corner and at maximum 600 mm (2 ft) around perimeter of fixture.

.8 [Interlock] [Attach] cross member to main runner to provide rigid assembly.

.9 Install suspension system to manufacturer’s instructions and ULC tested design requirements.

.10 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.

3.4 Panel Installation in Suspension System

.1 Install acoustical panels in ceiling suspension system.

.2 Install fibrous acoustical media [and spacers] over entire area above suspended metal panels.

.3 In fire-rated ceiling systems, secure lay-in panels with hold-down clips and protect over light fixtures, diffusers, air return grilles and other equipment to ULC requirements.

3.5 **Clean-up**

.1 Clean exposed metal work. Clean and replace panel units. Touch up scratches, abrasions and other defects in painted surfaces.

-End-

PART 1 – GENERAL

1.1 **Scope**

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for the installation of new dry packed cement base and new bonded thin-set seamless epoxy matrix terrazzo, patching and refinishing of existing venetian terrazzo floors and base as shown on the drawings described herein or as necessary to complete the work.

1.2 **Related Work Under Other Sections**

.1 Section 03300: Cast-in-place Concrete, [co-ordinating with work of this section.]

.2 Section 07900: Sealants, [co-ordinating with work of this section.]

1.3 **Standards**

.1 Do terrazzo work in accordance with the Terrazzo, Tile and Marble Association of Canada [TTMAC] Manual including the TTMAC Expansion Joint requirements. Tradesmen to have minimum 5 years experience in this type of work and trained to do Seamless Terrazzo

1.4 **Samples**

.1 Provide a manufacturers technical manual clearly showing the project name, terrazzo types, accessories and colours, together with installation, cleaning and maintenance requirements.

.2 Provide 150mm (6”) x 150mm (6”) sample of each colour finished.

1.5 **Examination**

.1 Visit site, determine existing conditions and limitations and requirements for protection of adjacent areas; verify dimensions.

1.6 **Delivery and Storage**

.1 Deliver in original packages and containers. Handle materials carefully to avoid damage to new and existing work. Store materials under suitable protective coverings on skids clear of ground or floor. Keep dry and free from foreign matter.

1.7 **Environmental Conditions**

.1 Maintain air and structural base temperatures at 12 degrees C minimum or 20 degrees C maximum for 24 hours before, during and after installation.

1.8 **Warranty**

.1 Provide a signed certificate warranting materials and installation against cracking, splitting, discolouration or loosening for a period of [2] years from the date of the certificate of final acceptance.

PART 2 – PRODUCTS

2.1 **Terrazzo Binder:** To ASTM D-2240, D-638, D-695, D-790, and D-1308 seven days at room temperature 73-77 degrees F (22.8-25 degree C) and 50% +/- 2 % RH, by immersion method. Two component material consisting of resin, curing agent, chips and pigment.

2.2 **Conductive Matrix :** As recommended by the manufacturer.

2.3 **Marble and Granite Chips:** size #0 and #1 clean and sound. Blend of #0 (40%) and #1 (60%) for 9.5mm (3/8") matrix.

2.4 **Colour Pigments:** Non fading mineral pigments to British standard 1014.

2.5 **Divider Stips:** 10mm (3/8") deep zinc 'T' or angle profiles and attached with approved anchors. As required to match existing site conditions.

2.6 **Divider Stips Anchors and Adhesive:** Preformed Zinc, 'T' and 'L' shapes. As recommended by the manufacturer.

2.7 **Flexible Reinforcing Membrane:** Iso-C with fiberglass scrim reinforcing. Supplied by the manufacturer. ETON SEAMLESS TERRAZZO or equal

2.8 **Primer:** Moisture mitigating primer with maximum 0.3 perms with 100% RH. As recommended by the manufacturer.

2.9 **Sealant:** Slip and Stain resistant to ASTM D-2047 Urethane Penetrating Sealer, high performance, high gloss, chemical-resistant.

2.10 **Cleaners, Sealers and Floor Finish:** Terrazzo, Tile and Marble Association of Canada Types 1001,1002,1003,1004,2001,2002 and 3001 as applicable and as recommended by the manufacturer.

2.11 **Seamless Terrazzo Bonding Agent:** Eton Surfaces Bonding AGENTS or equal.

2.12 **Seamless Terrazzo System Products:** Eton Surfaces Floor System, Luca Verde (917) 566-1341 or (917) 565 5750 luca.verdi@etonsurfaces.com or equal.

2.13 **Waterproofing membrane:** Kerdi membrane by Schluter Systems or equal.

2.14 **Dry Packed Cement Base:** Portland Cement To CAN/CSA-A5-M88, Type 10, Normal.

2.15 **Resurfacing Bonding Agents:** Latex emulsion for use as a bonding agent existing concrete slab before install of dry packed cement base.

Acceptable Products: Or Equal

W. R. Meadows	'Sealtight - Bodlok'
Sternson	'Surfacrete Concentrate'

PART 3 – EXECUTION

3.1 **Preliminary Work**

.1 Give at least [5] days notice to the Architect before starting work.

3.2 **Preparation of Surfaces**

.1 Examine all surfaces upon which the work of this section is to be installed and report any defects to the Architect.

.2 **Dry grinding with HEPA vac system is required for all existing refinished terrazzo floor and base surfaces.** Clean existing surface using TTMAC recommended surface cleaner and rinse clean. After grinding apply terrazzo matching filler/leveler to manufacturer's directions and cure ready for installation of replacement materials. Maximum surface tolerance 1:400.

.3 Seamless terrazzo shall be sound with steel trowel finish exactly 16mm below finished floor levels, conforming to general contour required. All base slabs shall be clean and sound.

.4 For refinishing of existing terrazzo and base dry grind all surfaces with HEPA vac system.

.5 For any patching, remove all defective or damaged work before patching with new terrazzo material to match existing.

3.3 **Installation**

.1 Install all new divider strips as shown of drawings or as required to complete the work to existing slab with approved anchors.

.2 Concrete to 28 day cure minimum. Clean floor slab, remove laitance by wet grind and or acid etch and rinse thoroughly with clean water. Moisture content in slab shall not exceed 16% to ASTM F-2170. Perform moisture testing before installation.

.3 Apply bonding agent and install dry packed cement base sloped to drains and waterproofing membrane in shower and floor drain areas as shown on drawings or as necessary to complete the work.

.4 Mix and install seamless terrazzo system and apply terrazzo bonding agent before install of terrazzo strictly under specifications of manufacturer and where possible under the direction of the manufacturer's representative. Mask all adjacent surfaces.

.5 Dry grinding with HEPA vac system is required for all new and refinished terrazzo surfaces. Grout terrazzo when it has set sufficiently hard as specified for thin set terrazzo topping.

.6 For new and refinishing of existing terrazzo surfaces apply minimum 2 coats of penetrating sealer to all surfaces and final non slip wax coating.

.7 For any patching remove and replace defective or damaged work.

3.4 **Clean-up**

.1 Remove debris; thoroughly wax with non-slip product and clean all terrazzo surfaces and leave ready for occupancy.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for the installation of resilient floor tile, sports flooring, transitions and wall base shown on the drawings, described herein, or as necessary to complete the work.

1.2 Related Work Under Other Sections

.1 Section 010010: Manufactured Specialities, [supply floor sockets to this section for installation.]

1.3 Standards

.1 Do resilient tile and base work in strict accordance with the detailed directions of the manufacturer's supplying the material.

1.4 Samples

.1 Provide a manufacturer's physical 300mm x 300mm (12"x12") sample for each colour and type specified and technical data clearly showing the project name, tile types, accessories and colours, together with installation, cleaning and maintenance requirements.

1.5 Shop Drawings

.1 Submit [6] copies of shop drawing clearly indicating gym line layouts and colours and provide custom paint colour drawn down cards.

1.6 Maintenance Materials

.1 Provide extra (1) standard size full box of each floor tile and base type and colour from the same production runs as the materials to be installed. Store where directed for future maintenance use.

1.7 Delivery and Storage

.1 Deliver in original packages and containers. Handle materials carefully to avoid damage to new and existing work. Store materials under suitable protective coverings on skids clear of ground or floor. Keep dry and free from foreign matter.

1.8 Environmental Conditions

.1 Maintain material and room at 20 degrees C minimum for 24 hours before, during and after installation.

.2 Maintain air and structural base temperatures at temperatures recommended by material manufacturers for 48 hours before, during and 48 hours after installation.

1.9 Warranty

.1 Provide a signed certificate warranting material and installation against loosening, cupping and shrinking for a period of ten [10] years from the date of the certificate of final acceptance.

PART 2 - PRODUCTS

2.1 Materials

.1 **Vinyl Composition Tile:** To CAN/CSA-A126.1-M84, 300 x 300 mm size (12"x12"), 3.2 mm ($^1/_8$") thick, Type A, Waterproof abrasive resistant in standard, colour and pattern as selected by Architect.

Acceptable Products: *Or Approved Equal*

Tarket ' VCT II colour selected by Architect'

.2 **Resilient Sheet Sports Flooring:** **Full cover glue down** heterogeneous vinyl sheet floor covering with backing to ASTM F1303/ASTM F2772 class 2/ASTM F386/ASTMF410, 6 mm minimum thick, with 28mil wear layer, Waterproof abrasive resistant in standard.

Acceptable Products: *Or Approved Equal*

Tarket 'Omnisports Multiflex 6.5mm, beech 9001

Gerflor 'Recreation 60, canadian maple 6062

Polyflor 'Sport 67, maple 7516

.3 **Base and Outside Corners:** Coved, top set, fire retardant nitrile rubber plasticized vinyl to CAN/CSA A126.5-87, Type 2 and CAN/ULC S102.2-M88, plain pattern, 2.4 mm ($^3/_{32}$") thick, 100 mm (4") high, in maximum lengths, and with preformed external corners. Maximum flame spread rating 25, maximum smoke developed 60, colour black and size as indicated on drawings.

Acceptable Products: Or Approved Equal

Johnsonite ' 100mm (4") Dura-Cove, colour black'

.4 **Reducing Transition Strips:** Continuous Stepless transition trim, of sections listed below.

Acceptable Products: Or Approved Equal

Schluter: ' reno ramp satin aluminum transition to adjacent flooring thickness or zero glued and mechanically fastened to existing subfloor'

.5 **Epoxy Sports Line Paint:** As recommended by the floor manufacturer; colours as noted on drawings.

.6 **Primer and Adhesive:**

.1 **For Sheet Sports Flooring and Vinyl Tile Flooring:** Waterproof, contact type, selected to suit all substrates and locations to flooring manufacturer's recommendations.

.2 **For Bases, Thresholds, etc.:** High wet strength, fire and smoke rated to CAN/CGSB 41-GP-34M and to primer and adhesives and manufacturers printed directions.

Acceptable Products: Or Approved Equal

Flextile	'1251-V'	[covebase cement] [rubber/vinyl]
Domcor/Deltal	'Covegrip #97'	

.7 **Filler/Leveller:** Purpose made polymer-cement self levelling underlayment compound.

Acceptable Products: Or Approved Equal

Ardex 'V1200'

.8 **Moisture Mitigation Membrane:** Full coverage purpose made one component water based 2 coat system moisture barrier.

Acceptable Products: Or Approved Equal

Ardex 'VR98'

.9 **Temporary Floor Protection Cover:**

Acceptable Products: Or Approved Equal

Ram Board 'RB 38-50 Cover board, RT3-164 Seam tape, ET 2.5-180 Edge tape. '

PART 3 - EXECUTION

3.1 Preliminary Work

.1 Give at least [5] days notice to the Architect before starting work.

.2 Provide temporary protection to all areas during operations.

.3 **Perform full electromagnetic scanning of floor to detect any piping, conduits or live wires before core drilling for any new floor sockets.**

3.2 Preparation of Concrete Subfloor

.1 Prepare all existing concrete subfloors to ASTM F710. Grind smooth all surfaces to remove all contamination on the substrate that may cause damage to the resilient flooring material. Permanent and non-permanent markers, pens, crayons, paint, etc., must not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and stain the flooring material.

.2 Remove all high spots and fill in all low spots, holes and cracks with specified filler. Fill cracks, holes, depressions and irregularities in the substrate use specified underlayment leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate. Do not install floor covering over expansion joints.

.3 Vacuum clean floor before applying new finished flooring.

.4 Concrete floors must be free of dust, solvent, paint, wax, oil, grease, residual adhesive, adhesive removers, film-forming curing compounds, silicate penetrating curing compounds, sealing, hardening or parting compounds, alkaline salts, excessive carbonation or laitence, mold, mildew, and other foreign materials that may affect dissipation rate of moisture from the concrete, discoloration or adhesive bonding.

.5 Apply specified filler/self leveling product over entire surface as per manufacturer's instructions.

.6 Apply specified moisture mitigation membrane product over entire surface as per manufacturer's instructions.

3.3 Tile Application

.1 Apply adhesive uniformly over surface using notched spreader as recommended by the tile manufacturer. Spread only sufficient adhesive to ensure that tile covering is complete before initial set occurs.

.2 Lay tile with joints parallel to building lines; produce a symmetrical tile pattern; use minimum 1/2 width border tile.

.3 Unless otherwise detailed, install tile to a staggered ashlar pattern, with continuous joints flowing with the direction of mottle and parallel to the longer dimension of the room or area. Stagger cross joints alternately by half a tile.

.4 Carefully scribe and cut tile to fit around fixed objects, corners, frames, etc.

.5 Install all new 1 piece stair treads/risers/stringers to stairs as shown on drawings.

.6 Install specified nosing strips at unprotected edges, or exposed edges and special visually impaired edge nosing at front of stage.

.7 Roll tile with a 45 kg (100lb.) 3 section roller to expel air bubbles and level other imperfections.

.8 Use full spread coverage adhesive as recommended by the Manufacturer.

3.4 **Sheet Application**

.1 Apply adhesive uniformly over entire surface using notched spreader as recommended by the tile manufacturer. Spread only sufficient adhesive to ensure that tile covering is complete before initial set occurs.

.2 Lay rolls in sequential order following roll numbers on the labels.

.3 Unless otherwise detailed, install tile to a staggered ashlar pattern, with continuous joints flowing with the direction of mottle and parallel to the longer dimension of the room or area. Stagger cross joints alternately by half a tile.

.4 Carefully scribe and cut tile to fit around fixed objects, corners, frames, etc.

.5 Reverse non-pattern sheets as referenced in Manufacturer's Installation Instructions

.6 Install different colour accent in lay according to layout as shown on drawings.

.7 Provide and install all specified aluminum transition strips before flooring install.

.8 Roll finished floor with a 45 kg (100lb.) 3 section roller to expel air bubbles and level other imperfections.

.9 Continuously heat weld all seams to provide watertight seal.

.10 Use full spread coverage adhesive as recommended by the Manufacturer.

.11 Layout all sports floor game lines as shown on drawings, mask off, clean, prime and epoxy paint all specified colours to manufacturer's instructions.

.12 Install all new equipment floor sockets as shown on drawings flush with top of new finished floor as per manufacturer's instructions.

3.5 Base Application

.1 Apply adhesive to clean dry wall and floor only.

.2 Lay out base to minimize number of joints.

.3 Set preformed external corners.

.4 Set base in full bed of adhesive to both wall and floor surfaces, straight, level and to 1:400 tolerance.

.4 To produce tight closed joints, scribe and fit bases accurately coped at internal corners to produce tight closed joints to preformed corners, door frames and other objects.

3.6 Clean-up and Protection

.1 Remove excess adhesive with approved stripper solution; rinse and dry.

.2 Wash floor tile and bases to manufacturer's directions.

.3 Prohibit traffic on floor for 48 hours after installation.

.4 Remove and dispose of debris and leave premises in a washed condition.

.5 Provide and install temporary floor protection cover over finished flooring during work of other trades that will follow. When all work is completed remove temporary cover and perform final thorough cleaning to satisfaction of owner.

.6 **Owner will be responsible for the sealing and waxing of the floors and bases.**

.7 Provide extra (1) standard size box of each tile for future maintenance.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for painting and finishing new and existing materials as shown on the drawings, described herein, or as necessary to complete the work.

1.2 Related Work Under Other Sections

.1 Section 04211: Basic Unit Masonry, [painting new masonry.]

.2 Section 05120: Structural Steel, [painting of structural steel.]

.3 Section 07900: Sealant, [co-ordinating with work of this section.]

.5 Section 09250: Gypsum Board, [painting of gypsum board.]

.6 Division 15: Mechanical, [painting of all mechanical items and painting ll mechanical grilles in Vestibule Ceiling to match metal tile colour.]

.7 Division 16: Electrical, [painting of all electric items.]

1.3 Standards

.1 **Paint Materials:** To MPI Architectural Painting Specification Manual and MPI Maintenance Repainting Manual, Exterior and Interior Systems. Provide signed certificate stating materials comply with the standards and that paint materials for each coating are products of one manufacturer only. Use only odourless solvent products in all interior locations. Do not mix or thin. Use materials and colours directly from the manufacturer's containers.

.2 **Workmanship Standards:** To MPI Architectural Painting Specification Manual and MPI Maintenance Repainting Manual, Exterior and Interior Systems as applicable with sufficient coats to provide full coverage, colour match and uniform sheen, but using minimum number of coats specified. Conform to regulations of authorities having jurisdiction.

1.4 Samples

.1 Submit the successful manufacturers colour system with the approved colours marked and related to those used on the approved colour schedule. Submit the colours to the Architect for approval and retention in the project file. Ensure finished work matches manufacturers colour sample.

1.5 Environmental Requirements

.1 Do not apply paint finish in areas where dust is being generated.

.2 Do not clean equipment, brushes, rollers, etc. on the premises.

.3 During paint operations, provide sufficient fresh air circulation.

.4 In cold weather, use temporary exhaust fans or ozone air purifier.

1.6 Delivery and Storage

.1 Deliver materials in original containers with labels intact and seals unbroken.

.2 Store materials under covers and protect from fire at all times. The Architect will not provide material storage space.

1.7 Protection

.1 Before commencement of work, remove cover plates of service devices, surface hardware, frames of lighting fixtures and all other obstructions. Replace them in satisfactory condition when work of this section is completed, to the approval of Architect.

.2 Before commencement of work, protect all surface hardware that is impractical to remove. Protect all weather stripping, acoustic and smoke seal gaskets in an approved manner.

.3 Remove soiled and used rags, waste and empty containers from the building daily. Take all precautions to preclude a fire.

.4 Post legible signs at all points of entry to the areas in which work of this section is being applied.

.5 Erect suitable barriers to prevent traffic and other trades from working in such areas during application of this work.

1.8 Inspection

.1 Have material suppliers' representatives visit site in company with Contractor and painter prior to commencement of operations to discuss finishing procedures to be used and to analyze conditions of surfaces to be coated, in order that alternative recommendations may be accorded consideration, should adverse conditions exist.

.2 Ensure that material suppliers' representatives visit site at intervals during surface preparation and application operations, to ensure that specified surface preparation has been completed, specified products are being used, proper number of coats are being applied, and specified finishing procedures are being implemented.

.3 Submit to Contractor and Architect a written report of material suppliers' representatives verify conformance to Specifications.

1.9 Maintenance Materials

.1 Provide extra (1) 4L unopened can of each colour of paint and stain. Store where directed for future maintenance use.

PART 2 - PRODUCTS

2.1 **Colours:** as selected by the Architect (Maximum up to 4 colours per space.)

2.2 **Gloss Values**

.1 Gloss values at 60% and Sheen Values at 85% determined in accordance with MPI Gloss:

.1	0 to 5 for flat.	max. 10 sheen
.2	5 to 10 for high sheen flat.	10-35 sheen
.3	10 to 25 for eggshell.	10-35 sheen
.4	25 to 35 for satin.	min. 35 sheen
.5	35 to 70 for semi-gloss	
.6	70 to 85 for gloss	
.7	85 to 100 for high gloss	

2.4 **Interior Finish Materials:**

.1 For New Concrete
One coat Block Filler
Two coats Primer Sealer
Two coats Satin or Semi-Gloss Enamel

.2 For Existing Concrete Block
One coat Multi Surface Primer Sealer for oil or latex based original paint
Two coats Satin Enamel

.3 For Epoxy Finish on New Concrete Block
Two coats Block Filler
One coat Epoxy Primer
Two coat Epoxy Colour Coat

.4 For Epoxy Existing Concrete Block
One coat Epoxy Multi Surface Primer for oil or latex based original paint
Two coat Epoxy Colour Coat

.5 For New Gypsum Board and Plaster Walls and Ceilings
One coat Primer Sealer
Two coats Flat Paint on Ceiling and Two coats Satin on Walls

.6 For Existing Gypsum Board and Plaster Walls and Ceilings
One coat Multi Surface Primer Sealer for oil or latex based original paint
Two coats Flat Paint on Ceiling and Two coats Satin on Walls

.7 For New Gypsum Board and Plaster Walls in High Humidity Areas
One coat Primer Sealer
Two coats Semi-Gloss Enamel

.8 For Existing Gypsum Board and Plaster Walls in High Humidity Areas
One coat Multi Surface Primer for oil or latex based original paint
Two coats Satin Enamel

.9 For Painted New Wood Doors (on exposed edges)
One coat Primer Sealer
Two coats Semi-Gloss Enamel

.10 For Painted Existing Wood Doors (on exposed edges)
One coat Multi Surface Primer for oil or latex based original paint
Two coats Semi-Gloss Enamel

.11 For New Primed Ferrous Metal Surfaces
One coat Spot Priming
One coat Multi Surface Primer for oil or latex based original paint
Two coats Gloss Enamel

.12 For Existing Primed Ferrous Metal Surfaces
One coat Spot Priming Rust Inhibitor Type
One coat Multi Surface Primer for oil or latex based original paint
Two coats Gloss Enamel

.13 For New Galvanized and Zinc Coated Metal
One coat Cementitious Galvanized Metal if bare metal or
One coat Primer
Two coats Semi-Gloss Enamel

.14 For Existing Galvanized and Zinc Coated Metal
One coat Cementitious Galvanized Metal if bare metal or
One coat Spot Priming Rust Inhibitor Type
One coat Multi Surface Primer for oil or latex based original paint
Two coats Semi-Gloss Enamel

.15 For Pipe Insulation Covering
One coat Tinted Primer
Sealer
One coat Semi-Gloss Enamel

.16 Existing and New Interior Wood Stained
One coat wiping stain
One coat sanding sealer
Two coats Semi-Gloss Varnish

2.5 Exterior Finish Materials

.1 For New Primed Ferrous Metal Surfaces
One coat Spot Priming
One coat Multi Surface Primer for oil or latex based original paint
Two coats Gloss Enamel

.2 For Existing Primed Ferrous Metal Surfaces
One coat Spot Priming Rust Inhibitor Type
One coat Multi Surface Primer for oil or latex based original paint
Two coats Gloss Enamel

.3 For New Galvanized and Zinc Coated Metal
One coat Cementitious Galvanized Metal if bare metal or
One coat Primer
Two coats Semi-Gloss Enamel

.4 For Existing Galvanized and Zinc Coated Metal
One coat Cementitious Galvanized Metal if bare metal or
One coat Spot Priming Rust Inhibitor Type
One coat Multi Surface Primer for oil or latex based original paint
Two coats Semi-Gloss Enamel

Acceptable Products: (Premium professional quality paint as per the current MPI Manual. Products with specific manufacturer listed will not be substituted without Architect's written approval)

Benjamin Moore
Dulux-Glidden
Para Paints and Coatings
Sherwin Williams
Or Approved Equal

PART 3 - EXECUTION

3.1 Preliminary Work

.1 Give at least [5] days notice to the Architect before starting work.

3.2 Preliminary Repairs

.1 Cut away the cracked or fissured finish to expose the primary substrate for a minimum of 300 mm (12") on both sides of the crack[s] or fissure[s].

.2 Examine substrate surface and where cracks or fissures are due to normal settlement or acceptable building movement, fill with compatible materials to material manufacturer's directions and the Architect's approval.

.3 Fill and neatly join repairs to existing work for both substrate and finish; trowel to an even, level and matching texture; cure and sand as required.

.4 Reprime entire repair to ensure colour and texture matches the surrounding finished surfaces prior to normal repainting operations.

3.3 Preparation of Surfaces

.1 Prepare wood surfaces to MPI standards:

.1 Use CAN/CGSB 10-GP-126M vinyl sealer over knots and resinous areas.

.2 Apply wood paste filler to nail holes and cracks.

.3 Tint filler to match stains used to finish woodwork.

.2 Touch up shop primer on steel with MPI approved primer applied to MPI procedures.

.3 Prepare galvanized steel and zinc coated surfaces to CAN/CGSB 85-GP-16.

.4 Prepare masonry, surfaces to MPI procedures.

.5 Prepare new wallboard surfaces to MPI procedures. Fill cracks with plaster patching compound.

.6 Prepare copper piping and accessories to MPI procedures.

.7 Thoroughly clean all existing surfaces, sand and scrape loose paint from existing surfaces, remove all abandoned wall plugs, nails, screws, remove all oil, grease, tar, etc., fill all holes and low areas flush with existing surfaces, sand and prime paint.

3.4 Application

.1 Sand and dust between each coat to remove defects visible from a distance up to 1.5 m (5 ft).

.2 Finish bottoms, edges, tops and cut-outs of doors after fitting as specified for door surfaces.

.3 Finish tops of cabinets and projecting ledges, above and below sight lines as specified for surrounding surfaces.

.4 Finish closets and alcoves as specified for adjoining rooms.

.5 Repainted surfaces within already painted areas must colour match existing.

.6 After painting, drawers, window sashes and doors must operate freely.

3.5 Mechanical and Electrical Equipment

.1 Paint exposed conduits, pipes, hangers and other mechanical and electrical equipment occurring in finished areas including inside cupboards and cabinet work. Colour and texture to match adjacent surfaces, except where noted otherwise.

.2 Paint interior of ductwork where visible with primer and one coat matte black paint.

.3 Paint both sides and edges of plywood backboards for mounting equipment before installation. Leave equipment in original finish except for touch-up as required; paint conduits, mounting accessories and other unfinished items.

3.6 Completion

.1 Remove protection; make good damage to this and adjacent work.

2 Remove materials, debris, tools, plant and equipment from the premises.

3.7 Clean-up

.1 Remove rubbish, rags and oily waste from the site daily and at final completion and keep areas clean.

.2 Upon completion, clean blemished surfaces to the Architect's satisfaction. Repair any damage. Replace hardware plates, drapes, pulls, etc.

.3 Leave building and painted site equipment in a 'cleaned and polished' condition.

To be completed by Contractor before commencing work as verification of Architects colour selection.

APPENDIX A

Project Date
Municipality Page of

1. Submit name of material manufacturer for future maintenance and matching.

   _____

2. List material manufacturers numbers which comply with CAN/CGSB Standard for each primer sealer, paint, varnish, enamel and filler.

Any unauthorized materials will be removed from the site.

_____ _____
Signature/Company Seal Date

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for the installation of specialty products, as shown on the drawings, described herein or as necessary to complete the work.

1.2 Related Work Under Other Sections

.1 Section 16: Electrical, [co-ordinating with work of this section.]

1.3 Delivery, Storage and Handling

.1 Delivery all materials as specified any defective, damaged, warped material or material deemed to be inferior to the specification by the Architect will be promptly replaced.

.2 All materials shall be stored and stacked in order to prevent damage from exposure to moisture.

1.4 Co-ordination and Co-operation

.1 Co-ordinate and co-operate with all other trades to ensure satisfactory and expeditious completion of the work.

.2 Co-ordinate installation of work to be built-in by other sections, also equipment to be incorporated into finished carpentry work.

.3 Review drawings of other sections affecting work of this section to co-ordinate locations of other components.

1.5 Samples

.1 Submit a copy of the manufacturer's product catalogue, clearly identifying the proposed products to the Architect for written approval prior to award of contract.

1.4 Shop Drawings

.1 Submit [6] copies of shop drawings, schedules and installation details, clearly showing site dimensions, sizes, materials, thicknesses, finishes, connections, joints, anchorage, supports, details and accessories. Fabricate only with the Architect's written approval.

PART 2 - PRODUCTS

2.1 **Gym Scoreboard:** Gym 118 (1-required) Wall mounted as shown on drawings.

Supplied By:
School Board installed by General Contractor

2.2 **Gym Equipment:** Gym 118 (as shown on drawings)

Acceptable Products:
Badminton end post Model # F50111 (qty 6)
Volleyball end posts c/w with protective padding Model #F50202 (qty 2)
Badminton net 20' with steel cable Model #F0417(qty 2)
Volleyball net 32' Model #F0412(qty 1)
Floor sockets 1-7/8" post diameter Model #F50401 (qty 8)
Floor mounted post storage rack for 4 posts (qty 2)

Wall mount side fold Basketball backstop
'Unit package c/w height adjuster, 48" extension with glass rectangular shaped backboard and breakaway collegiate goal' (qty 4) through bolted with hot dipped galvanized anchors weather sealed.
Wall mount side fold Basketball backstop
'Unit package c/w height adjuster, 84" extension with glass rectangular shaped backboard and breakaway collegiate goal' (qty 2) through bolted with hot dipped galvanized anchors weather sealed.
New Custom Protection Mats Apple Athletic Products Fixed 72" high x 48" wide wall/door mount padding 2" thick, sizes and locations as shown on drawings. All Cut-outs and door pads as required, colour selected by Architect. (qty 24).

Supplied By:
Forum Athletic Products
9 Browning Court., Bolton, On, 905-405-1222 Attn: Steven Strazzabosco
Or approved equal

2.3 **Metal Storage Shelving:** Storage 118D

Acceptable Products:
Heavy Duty metal storage shelving unit 18" deep x 42" wide x 76" high #MWS1842FB (qty 9) c/w MWS1824FB-ADD to create continuous shelving where shown.

Supplied By:
At Work Furniture
800-663-3325

Or approved equal

PART 3 - EXECUTION

3.1 Preliminary Work

.1 Give at least [5] days notice to the Architect before starting work.

.2 Provide temporary protection to all areas during operations.

3.2 Installation

.1 Install all items to manufacture's instructions and recommendations.

.2 Set items plumb, square, level, without any distortions, centered exactly in locations shown on drawings.

.3 Secure each item to the base structure in accordance with manufacturer's directions, details on drawings and approved shop drawings. Secure all metal shelving units to walls to prevent tipping.

.4 Provide clip angles, epoxy expansion bolts, shields, welded studs or toggles as required for each anchorage.

3.3 Clean-up

.1 Clean each metal specialty item using only cleaning agents recommended by the manufacturer. Leave installations in a 'finish polished' condition.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for the installation of all visual display boards and signage to locations shown on the drawings.

1.2 Related Work Under Other Sections

.1 Section 06200: Finish Carpentry, [co-ordinating with work of this section.]

.2 Section 07900: Sealants, [co-ordinating with work of this section.]

1.3 Examination:

.1 Examine all surfaces and conditions upon which the work of this section depends. Report all discrepancies to the Architect.

.2 Commencement of work means acceptance of these surfaces

1.4 Delivery, Storage and Handing

.1 Deliver and store materials undamaged in original wrappings and containers with manufacturers labels and seals intact.

.2 Store materials in suitable storage place. Prevent damage during handling and storage.

1.5 Shop Drawings

.1 Submit [6] copies of shop drawing clearly indicating types, materials, finishes, sizes, etc.

PART 2 - PRODUCTS

2.1 Materials:

.1 **Quantity and Location:** As Shown on Drawings

.2 **Sheet Steel:** To ASTM A526/A526M-85.

.3 **Aluminum Frame:** To Aluminum Association Alloy AA6063.T.5. 19 x 12 x 19 mm ($^3/_4$"x $^1/_2$"x $^3/_4$"), minimum wall thickness 1.0 mm (0.04")

.4 **Hardware:** Include minimum 4 keyhole steel mounting brackets.

.5 **Finishes:** White boards to be 'white' porcelain baked enamel. Aluminum to be clear anodized.

.6 **High Density Particle Core Backer Board:** 12 mm ($^1/_2$") for white boards and 6 mm ($^1/_4$") for cork boards.

Acceptable Products:
Architectural School Products or approved equal 'White Board'

2.2 **Fabrication:**

.1 **Frames:** Mitre all corners frames screwed to backing @ 150 mm (6") on centre.

.2 **Exposed Cork or Porcelain Surfaces:** To be pressure/heat factory laminated.

2.2 **Signage:**

.1 **As per attached Board Standards**

PART 3 - EXECUTION

3.1 **Erection**

.1 Install boards and signage in accordance with manufacturers instructions and Board's Guidelines attached.

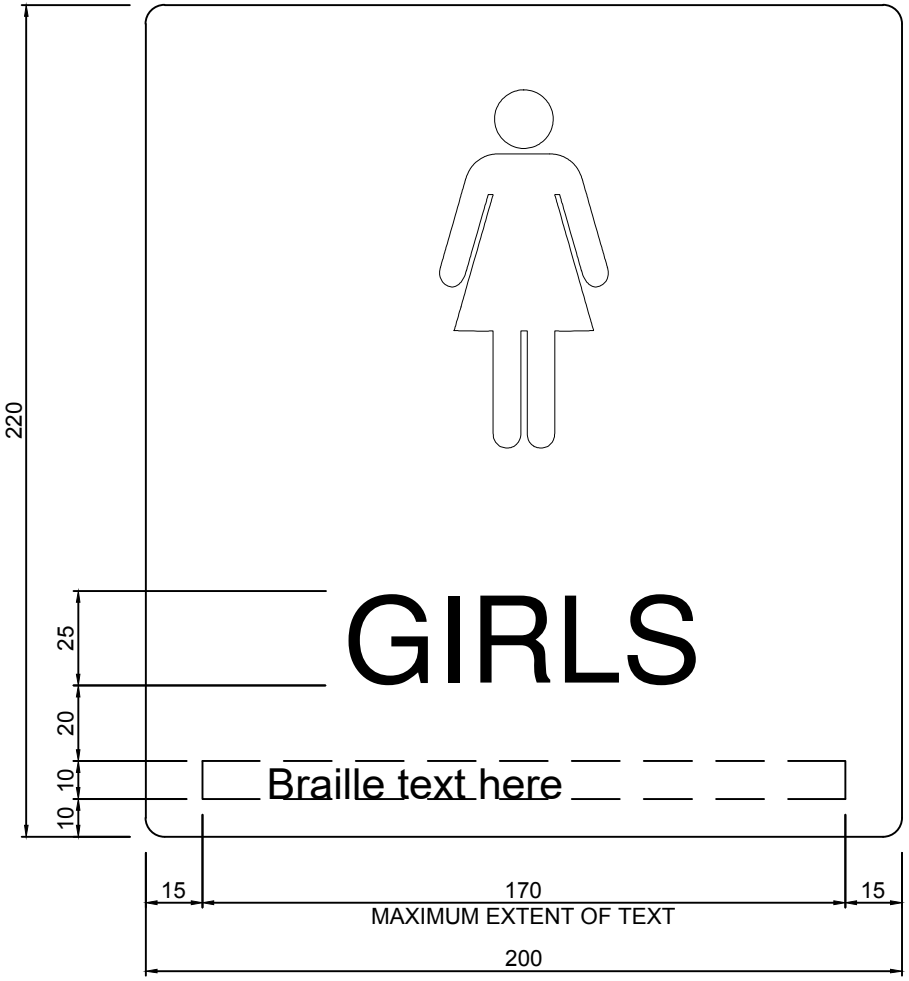
.2 Hang units, plumb, level, rigidly supported with toggle type anchor bolts in hollow stud walls.

3.2 **Clean-up**

.1 Remove debris resulting from the work.

.2 Leave installation in a tidy condition ready for use.

-End-



WS-3

SIGN TYPE 8:

GIRLS STUDENT WASHROOM FOR ELEMENTARY SCHOOL LEVEL

SIGNAGE NOTES:

REVERSE PAINTED 3mm P95 LASER CUT ACRYLIC SIGN.
SIGN CHARACTERS TO BE FINISHED WITH A MATTE/ GLARE-FREE SURFACE.
SIGN TO BE ADHERED WITH PL PREMIUM CONTRACTORS ADHESIVE.

ALL CHARACTERS ARE REQUIRED TO BE TACTILE, WITH THE PROPERTIES BELOW:

- RAISED MINIMUM 0.8mm ABOVE SIGN SURFACE
- UPPERCASE LETTERING WITH HEIGHT BETWEEN 16mm TO 50mm
- SMOOTH AT THE CHARACTER EDGES
- ACCOMPANIED BY CONTRACTED GRADE 2 BRAILLE
- BRAILLE DOT HEIGHT MUST BE BETWEEN 0.6mm - 0.9mm
- HAVE A TONAL CONTRAST OF 70% MINIMUM WITH SIGN BACKGROUND
  STANDARD: BLACK LETTERING ON WHITE SIGN BACKGROUND (SEE NOTE 3.4)

HAMILTON - WENTWORTH
DISTRICT SCHOOL BOARD

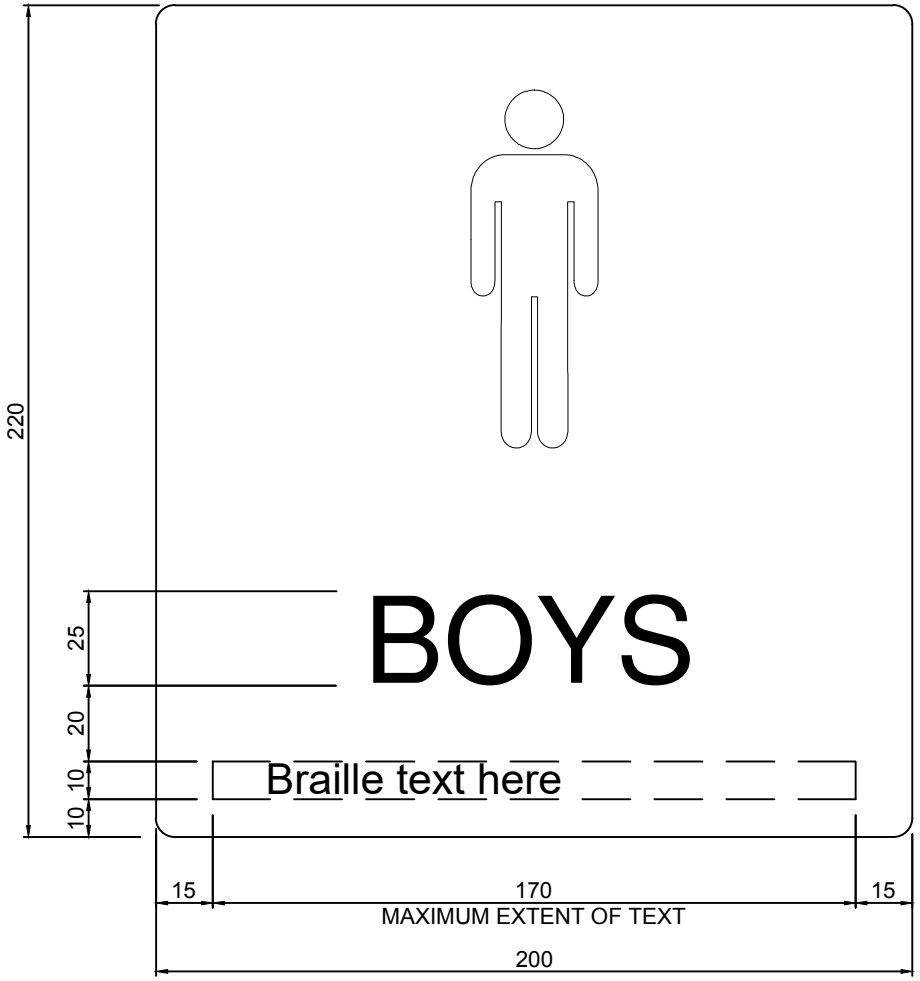
HAMILTON-WENTWORTH DISTRICT SCHOOL BOARD
TEL: 905.527.5092
FAX: 905.659.0104
20 EDUCATION COURT, P.O. BOX 2558
HAMILTON, ON L8N 3Z9
WWW.HWDSB.ON.CA

ELEMENTARY SCHOOL
INTERIOR SIGNAGE STANDARD

TITLE: INTERIOR SIGN TYPE 8

DRAWN CH DATE: MAY 2017	CHKD - DATE -	APPVD - DATE -
SCALE 1:2	DWG No. 12	REV 00

REV	DATE	DESCRIPTION	BY	CHKD



SIGN TYPE 10:

BOYS STUDENT WASHROOM FOR ELEMENTARY SCHOOL LEVEL

SIGNAGE NOTES:

REVERSE PAINTED 3mm P95 LASER CUT ACRYLIC SIGN.
SIGN CHARACTERS TO BE FINISHED WITH A MATTE/ GLARE-FREE SURFACE.
SIGN TO BE ADHERED WITH PL PREMIUM CONTRACTORS ADHESIVE.

ALL CHARACTERS ARE REQUIRED TO BE TACTILE, WITH THE PROPERTIES BELOW:

- RAISED MINIMUM 0.8mm ABOVE SIGN SURFACE
- UPPERCASE LETTERING WITH HEIGHT BETWEEN 16mm TO 50mm
- SMOOTH AT THE CHARACTER EDGES
- ACCOMPANIED BY CONTRACTED GRADE 2 BRAILLE
- BRAILLE DOT HEIGHT MUST BE BETWEEN 0.6mm - 0.9mm
- HAVE A TONAL CONTRAST OF 70% MINIMUM WITH SIGN BACKGROUND
  STANDARD: BLACK LETTERING ON WHITE SIGN BACKGROUND (SEE NOTE 3.4)

WS-5

HAMILTON - WENTWORTH
DISTRICT SCHOOL BOARD

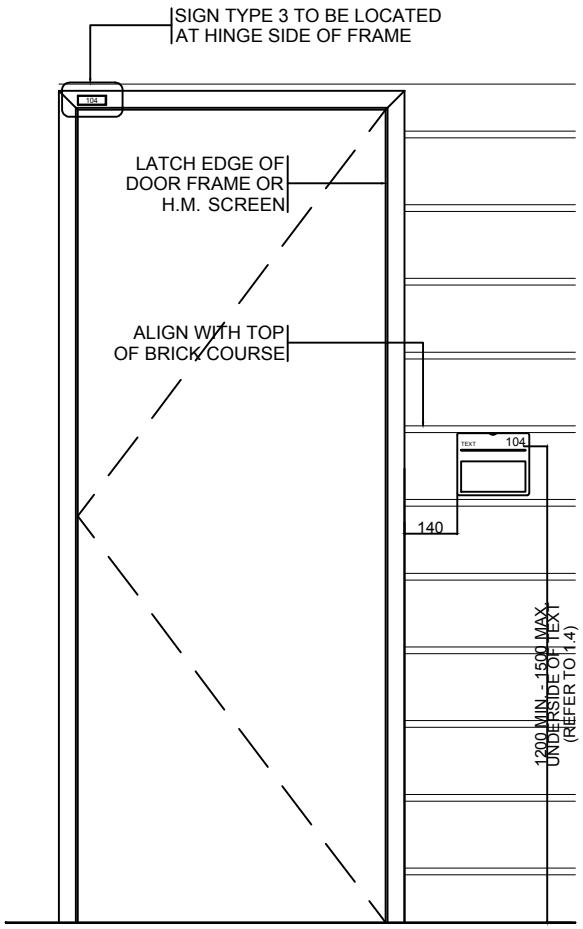
HAMILTON-WENTWORTH DISTRICT SCHOOL BOARD
TEL: 905.527.5092
FAX: 905.659.8104
20 EDUCATION COURT, P.O. BOX 2558
HAMILTON, ON L8N 3Z9
WWW.HWDSB.ON.CA

ELEMENTARY SCHOOL
INTERIOR SIGNAGE STANDARD

TITLE: INTERIOR SIGN TYPE 10

DRAWN: CN DATE: MAY 2017	CHKD: - DATE: -	APPVD: - DATE: -
SCALE: 1:2	DWG No. 14	REV 00

REV	DATE	DESCRIPTION	BY	CHKD



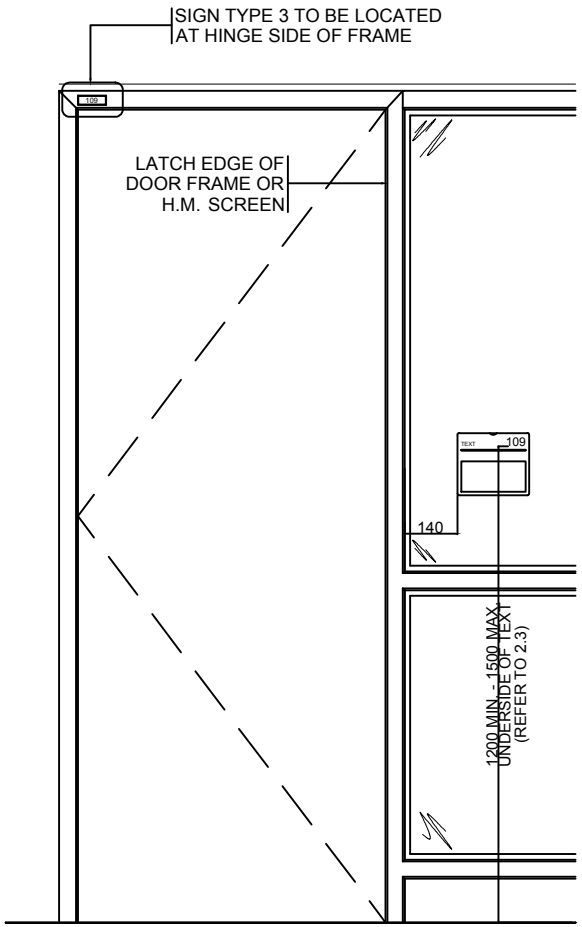
(A) WALL MOUNTED SIGN

1.1 SIGN IS TO BE LOCATED ON WALL ADJACENT TO LATCH SIDE OF DOOR.

1.2 WHERE THERE IS NO WALL SPACE ADJACENT TO THE LATCH SIDE OF THE DOOR, SIGN TO BE LOCATED ON NEAREST ADJACENT WALL.

1.3 IN THE CASE OF DOUBLE DOORS, THE SIGN SHOULD BE MOUNTED TO THE INACTIVE DOOR. IF BOTH DOORS OPEN, THE SIGN SHOULD BE MOUNTED TO THE RIGHT OF THE RIGHT HAND IF THERE IS NO ROOM TO THE RIGHT, THE SIGN CAN BE MOUNTED ON THE NEAREST ADJACENT WALL.

1.4 BASELINES OF RAISED CHARACTERS SHALL BE LOCATED BETWEEN 1200mm AND 1500mm ABOVE FINISHED FLOOR.



(B) GLASS MOUNTED SIGN

2.1 SIGN IS TO BE LOCATED AS SHOWN ON GLAZED SIDELIGHT, WHEN NOTED IN DOOR SCHEDULE, WHERE NO ADJACENT WALL IS AVAILABLE.

2.2 WHERE THIS IS REQUIRED, PROVIDE BACKING PANEL FOR OPPOSITE SIDE OF GLASS. BACKING PANEL TO BE FINISHED TO MATCH SIGN MATERIAL.

2.3 BASELINES OF RAISED CHARACTERS SHALL BE LOCATED BETWEEN 1200mm AND 1500mm ABOVE FINISHED FLOOR.

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DISTRICT SCHOOL BOARD

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HAMILTON, ON L8N 3E9
WWW.HWDSB.ON.CA

SECONDARY SCHOOL
INTERIOR SIGNAGE STANDARD

TITLE: MOUNTING DETAILS

DRAWN: CN DATE: MAY 2017	CHKD: - DATE: -	APPVD: - DATE: -
SCALE: 1:20	DWG No. 19	REV 00

REV	DATE	DESCRIPTION	BY	CHKD

3.0 SUMMARY OF TYPOGRAPHY FOR TACTILE SIGNS:

3.1 HEIGHT FOR TACTILE INFORMATION:

- MINIMUM HEIGHT REQUIREMENT OF 16 mm
- MAXIMUM HEIGHT REQUIREMENT OF 50 mm

3.2 ACCEPTABLE TACTILE FONTS:

- TACTILE SHOULD BE ALL UPPERCASE
- RAISED MINIMUM OF 0.8 mm ABOVE THE SIGN SURFACE
- CHARACTERS SHOULD NOT BE ITALIC, OBLIQUE, SCRIPT OR HIGHLY DECORATIVE
- CHARACTERS SHOULD HAVE A FONT STYLE OF SANS SERIF

3.3 SPACING FOR MULTI-LINE TEXT:

- SPACING BETWEEN LINES OF TEXT SHOULD BE NO LESS THAN 135% OF THE CORRESPONDING TEXT HEIGHT (MEASURED FROM BASELINE TO BASELINE)
- SPACING BETWEEN LINES OF TEXT SHOULD BE NO GREATER THAN 170% OF THE CORRESPONDING TEXT HEIGHT (MEASURED FROM BASELINE TO BASELINE)

3.4 COLOUR SCHEME STANDARD:

- BLACK LETTERING ON A WHITE SIGN BACKGROUND

4.0 SUMMARY OF BRAILLE SPECIFICATIONS:

- MUST BE GRADE II WITH CONTRACTIONS
- SHAPE OF BRAILLE CHARACTERS MUST ALWAYS BE ROUNDED
- BRAILLE MUST BE PLACED DIRECTLY BELOW CORRESPONDING RAISED CHARACTERS
- BRAILLE IS TO BE PLACED BELOW ALL TEXT, IF MULTI-LINED, AND SEPARATED 10 mm FROM ANY OTHER TACTILE CHARACTERS
- SHOULD BE SEPARATED 10 mm MINIMUM FROM RAISED BOARDERS AND DECORATIVE ELEMENTS
- MUST ALWAYS BE LOWERCASE
- UPPERCASE CHARACTERS SHOULD ONLY BE USED FOR THE FIRST WORD AT THE BEGINNING OF A SENTENCE, NAMES, PROPER NOUNS, INITIALS, ACRONYMS, AND INDIVIDUAL LETTERS OF THE ALPHABET

5.0 SUMMARY OF LOCATION OF PERMANENT ROOM SIGNS:

5.1 MOUNTING AREA:

- MOST OFTEN, SIGN SHOULD BE MOUNTED ON THE STRIKE SIDE OF THE DOOR
- IF THERE IS NO ROOM, SIGN CAN BE PLACED ON THE NEAREST ADJACENT WALL

5.2 DOOR MOUNTING:

- SIGN CAN ONLY BE DOOR MOUNTED IF THERE IS NO ROOM ON ADJACENT WALLS RELATIVE TO THE DOOR
- WHERE THIS IS REQUIRED, PROVIDE BACKING PANEL FOR OPPOSITE SIDE OF GLASS. BACKING PANEL TO BE FINISHED TO MATCH SIGN MATERIAL.
- IN THE CASE OF DOUBLE DOORS, THE SIGN SHOULD BE MOUNTED TO THE INACTIVE DOOR.
- IF BOTH DOORS OPEN, THE SIGN SHOULD BE MOUNTED TO THE RIGHT OF THE RIGHT HAND DOOR
- IF THERE IS NO ROOM TO THE RIGHT, THE SIGN CAN BE MOUNTED ON THE NEAREST ADJACENT WALL.
- SIGN TO BE MOUNTED CENTERED HORIZONTALLY ON THE DOOR.
- BASELINES OF RAISED CHARACTERS SHALL BE LOCATED BETWEEN 1200mm AND 1500mm ABOVE FINISHED FLOOR.

5.3 MOUNTING HEIGHT:

- BASELINE OF CHARACTERS MUST BE LOCATED BETWEEN 1200 mm AND 1500 mm ABOVE FINISHED FLOOR

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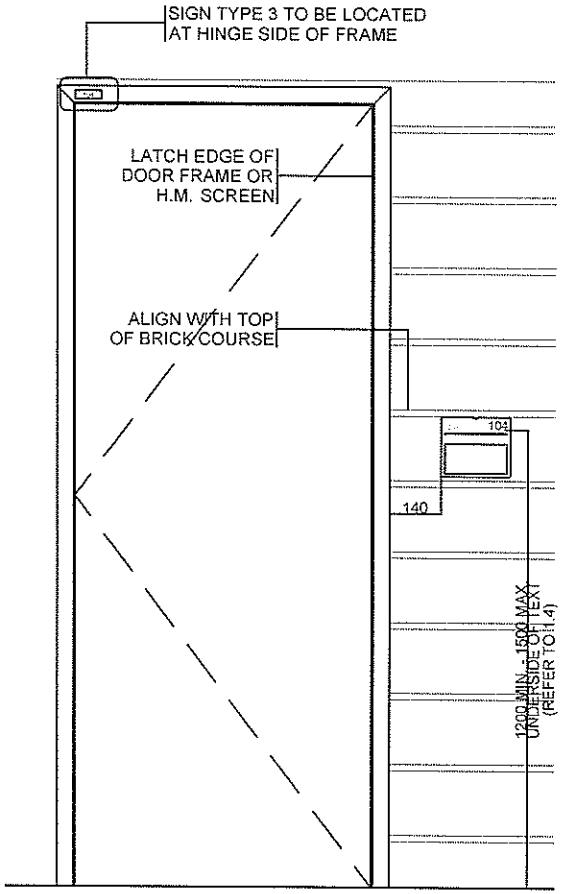
20 EDUCATION COURT, P.O. BOX 2558
HAMILTON, ON L8N 0B9
WWW.HWDSB.ON.CA

SECONDARY SCHOOL
INTERIOR SIGNAGE STANDARD

TITLE
INTERIOR SIGN NOTES

DRAWN CN DATE MAY 2017	CHKD - DATE -	APPVD - DATE -
SCALE 1:2	DWG No. 20	REV 00

REV	DATE	DESCRIPTION	BY	CHKD



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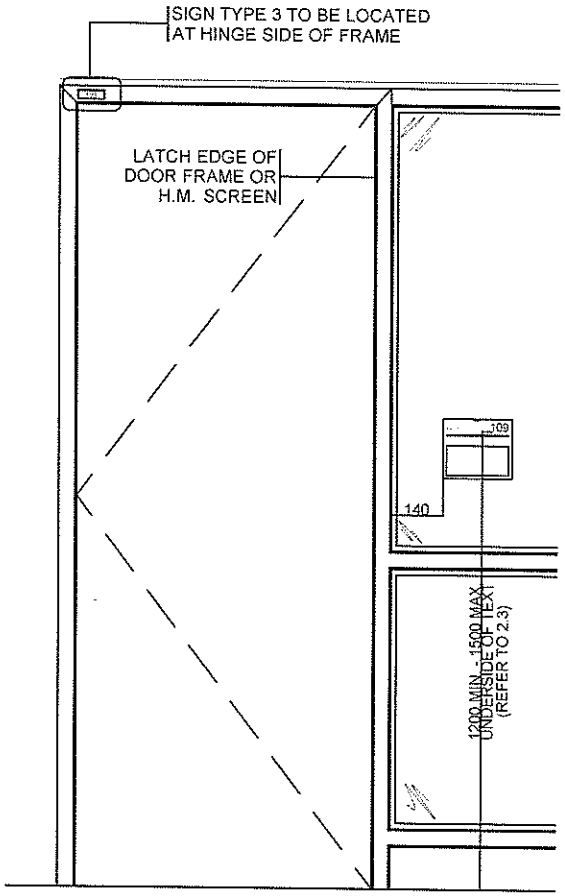

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HAMILTON, ON L8N 0E9
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SECONDARY SCHOOL INTERIOR SIGNAGE STANDARD

TITLE: MOUNTING DETAILS

DRAWN CH DATE MAY 2017	CHKD - DATE -	APPVD - DATE -
SCALE 1:50	DWG No. 19	REV 00

REV	DATE	DESCRIPTION	BY	CHK'D

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements

.2 Provide materials, labour and equipment for the installation of metal toilet partitions, urinal screen and required accessories as shown on the drawings, described herein or as necessary to complete the work.

1.2 Related Work Under Other Sections

.1 Section 07900: Sealant, [co-ordinating work with this section.]

.2 Section 10811: Washroom Accessories, [co-ordinating work with this section and install all washroom accessories and grab bars attached to partitions.]

1.3 Shop Drawings

.1 Submit [6] copies of shop drawings or catalogue illustrations indicating fabrication details, metal gauges, plans, elevations, hardware and installation details.

PART 2 - PRODUCTS

2.1 Materials

.1 **Galvanized Steel Sheet:** Commercial quality, to ASTM A526/A526M-85 with Z275 zinc coating.

.2 **Steel Sections:** To CAN/CSA -G40.21-M87, Type 44W.

.1 **Quantity, Type and Location:** Provide the following units, Standard headrail braced floor and wall mount partitions.

.2 **Doors & Panels:** 0.76 mm (22 ga) galvanized zinc coated cold rolled steel sheet to A446 Grade A.

.3 **Pilasters:** 1.21 mm (16 ga) galvanized zinc coated cold rolled steel sheet to A446 Grade A.

.4 **Trim:** 1.06 mm (18 ga) galvanized zinc coated cold rolled steel sheet to A446
Grade A.

.3 **Hardware:**

.1 **Hinges:** (2) Non-gravity type pivot tamperproof hinges chrome plated per door.

.2 **Latch & Bumber:** Single point locking by means of concealed chrome plated slide bolt and 'U' shaped heavy duty anodized aluminum pull. The door shall close with a tight fit on the full length of the strike with (1) chrome plated zinc die cast stop c/w rubber bumber.

.3 **Wall and Connecting Brackets:** Provide polished aluminum brackets with tamperproof bolts.

.4 **Attachments:** Through male/female type sex bolts with tamperproof heads. Pilaster support plated anchor bolts to be 9mm ($^3/_8$") diameter and connected to pilasters with a uniform single piece channel welded integraly.

.5 **Finish and Colour:** All parts to ASTM B117-90 high grade factory powder coat finish colour (2) coats plus primer or polyurethane powder coating paint finish, colour as selected by Architect from manufacturers standard colour range.

.6 **Logo:** Universal handicap logo symbol self adhesive vinyl decal to outside face of handicap stall door.

Floor mount overhead braced type

Acceptable Products or equal:

ASI	'Anti-graffiti Powder Coat c/w solid dent resistant core, overhead braced.'

2.2 **Fabrication**

.1 **Doors and Panels:** 25 mm (1") thick minimum, two sheet steel faces pressure laminated to honeycomb steel core maximum 25 mm (1") cell grid, mitred, brass welded and brazed formed edges tension interlocked with roll formed oval crown locking bar to form a sealed hygienic unit, to sizes indicated c/w 1/8" solid masonite core for dent resistance.

.2 **Pilasters:** 32 mm ($1^1/_4$") thick minimum, constructed same as door, to sizes indicated.

.3 **Plinth Trim:** 76mm (3") high, 0.76 mm (22 ga) polished stainless steel roll formed trim secured with concealed clips.

.4 **Pilaster Shoes:** 75 mm (3") high, 0.8 mm ($^1/_{32}$") thick, die formed stainless steel.

.5 **Edges:** Formed and closed edges for doors, panels and pilasters. Mitre and weld all corners and grind smooth.

.6 **Reinforcement:** Internally reinforce at areas of attached hardware and fittings. Temporarily mark location of reinforcement for tissue holders and grab bars.

PART 3 - EXECUTION

3.1 Preliminary Work

.1 Give at least [5] days notice to the Architect before starting work.

3.2 Partition Erection (Metal Ceiling Hung)

.1 Provide templates, details and instructions for building in toilet partition anchors.

.2 Install partitions secure, plumb and square. Use male/female through bolts or screws.

.3 Leave 12 mm ($^1/_2$") space between wall and panel or end pilaster.

.4 Attach fixing brackets securely to hollow walls using bolts and toggle type anchors.

.5 Attach panel and pilaster to brackets with through type sleeve bolt and nut or screws.

.6 Provide for adjustment of floor variations with screw jack through steel saddles made integral with pilaster. Conceal floor fixings with stainless steel shoes.

.7 Equip each door with hinges, latch set, and handle. Adjust and align hardware for easy, proper function. Set door open position at 30 degrees to front. Install universal handicap logo symbol decal to outside face of handicap stall door.

.8 Make good or replace powder coated surfaces damaged during shipment and/or installation, to satisfaction of Architect.

3.3 Installation of Accessories and Grab Bars

.1 Locate/re-locate new and existing accessories as indicated on drawings or where directed by the Architect.

.2 Install rigidly and anchor fixtures in place as follows:

.1 Install grab bars with built-in anchors provided in accordance with template, details and instructions by bar manufacturer into solid walls and/or through bolt to partition panel.

.2 Use tamperproof screws/bolts for fastening.

3.4 Clean-up

.1 Remove debris resulting from the work.

.2 Remove protective covering and leave installation in a clean and polished condition.

-End-

PART 1 - GENERAL

1.1 Scope

.1 Comply with Division 1: General Requirements.

.2 Provide materials, labour and equipment for the installation of washroom accessories [including those required in accommodation provided for disabled persons] as shown on drawings, described herein or as necessary to complete the work.

1.2 Related Work Under Other Sections

.1 Section 06200: Finish Carpentry, [co-ordinating work with this section and provide all washroom accessories and grab bars attached to partitions for installation by this section.]

.2 Section 10160: Metal Toilet Compartments, [co-ordinating work with this section and provide all washroom accessories attached to partitions for installation by this section.]

1.3 Shop Drawings

.1 Submit [6] copies of shop drawings or catalogue illustrations indicating size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame and building-in details of anchors for grab bars.

PART 2 - PRODUCTS

2.1 Materials:

.1 **Sheet Steel:** Commercial grade, stretcher levelled sheet steel to ASTM A526/A526M-85 with G90 zinc coating to ASTM A525M-80.

.2 **Stainless Steel Sheet:** To ASTM A666-87, Type 302, No. 4 finish.

.3 **Steel Tubing:** 25 mm (1") OD tubing of 1.2 mm ($^{1}/_{16}$") wall thickness.

.4 **Fasteners:** Stainless steel tamperproof screws and bolts torx or 2 hole snake eyes type; expansion shields, butterfly, lead or eazy anchor type, as recommended by fixture manufacturer.

2.2 Finishes:

.1 **Chrome and Nickel Plating:** To ASTM B456-85 [satin] [polished] finish.

.2 **Stainless Steel:** To ASTM A666-87, Type 302, No. 4 finish, minimum 0.8 mm thick.

.3 **Baked Enamel:** To product manufacturers standard. Colour selected from standard range by the Architect.

.4 **Manufacturers or Brand Names:** Not acceptable on exposed faces.

2.3 **Washroom Accessories:** Provide the following accessories as supplied by Bobrick Washroom Equipment and Frost as noted.

.1 **Room 118A and 118G:** toilet roll dispenser, soap dispenser and sanitary napkin units supplied by owner installed by general contractor, (**2**) surface mount stainless steel framed mirror over other sink 460 wide x 910 high mm (18"x 36") *B-290-1836,* (**4**) surface mount coat hooks *F-1150-SS*, (**2**) surface mount waste receptacles *F-326*.

Other Acceptable Manufactures: All products must be equal to base bid above.
ASI
Frost
Watrous

2.4 **Fabrication**

.1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.

.2 Wherever possible, form exposed surfaces from one sheet of stock, free of joints.

.3 Brake form sheet metal work with 1.5 mm ($^1/_{16}$") radius bends.

.4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

.5 Back paint components where contact is made with other building finishes to prevent electrolysis.

.6 Hot dip galvanize ferrous metal anchors and fastening devices to CAN/CSA-G164-M1981.

.7 Shop assemble components and package complete with anchors and fittings.

.8 Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates or rough-in measurements as required.

.9 Provide steel anchor plates and components for installation on studding and building framing.

PART 3 - EXECUTION

3.1 **General**

.1 Installation by Sections listed above.

.2 **All toilet roll holders, sanitary waste units and soap dispensers, supplied by owner or relocated from existing rooms to be installed by General Contractor for all rooms indicated and as shown on the drawings.**

-End-