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DURHAM DISTRICT SCHOOL BOARD

TENDER # T23-34

TENDER DOCUMENTS
FOR
RENOVATIONS PHASE 2
AT
RS McLaughlin CVI
570 Stevenson Road North
Oshawa, Ontario. L1J 5P1

Contractors shall carefully examine and study all of the Contract Documents and shall visit the site(s) of proposed work in order to satisfy themselves by examination as to all conditions and dimensions.

Project No. 21-60B

For Tender

CONSULTANT TEAM

Prime Consultant / Architect	Susan Friedrich Architect Inc. 643 St. Clair Ave. West, Toronto, Ontario M6C 1A7 telephone: (416) 588-3740 fax: (416) 588-2401
Structural	Lea Consulting Ltd. 425 University Avenue, Suite 400, Toronto Ontario L3R 9R9 telephone: (905) 470-0015 fax: (905) 470-0030
Mechanical & Electrical Engineers	CIMA+ DES 415 Baseline Road West, 2nd Floor Bowmanville, Ontario. L1C 5M2 telephone: (905) 697 4464

LIST OF CONTACTS

GENERAL

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Contact: Rick Racioppa, Major Projects Supervisor Facilities Services

ARCHITECTURAL AND GENERAL

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STRUCTURAL

Structural: Lea Consulting Ltd.
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MECHANICAL AND ELECTRICAL

Mechanical Engineers: CIMA+ DES

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SCHEDULES

ROOM FINISH SCHEDULE

TO BE READ IN CONJUNCTION WITH ROOM FINISH SCHEDULE ON DRAWINGS AND ALL PLANS,ELEVATIONS, DETAIL DRAWINGS, ETC.

List of Abbreviations and Materials:

ACT	Acoustic Ceiling Tile (24" x 48" existing)
ARF	Athletic Resilient Flooring
CA	Clear Anodized
Cab	Cabinet / Millwork
CB	Chalkboard
Conc	Concrete
CMU	Concrete Block
C-Board	Cement Board
CP	Control Panel
Cpt	Carpet
CT	Ceramic Tile
Gl	Glass
GB	Gypsum Board
GWG	Georgian Wired Glass
Met	Metal
Pt	Paint
Pl	Plaster
P-lam	Plastic Laminate
R	Rubber
Res	Resilient Sheet Flooring
TB	Tackboard
Terr	Terrazzo
VCT	Vinyl Composition Tile
WB	White Board
Wd	Wood
WP	Waterproofing

GENERAL FINISH NOTES:

a) Walls shown painted shall be properly prepared including removal of existing wall coverings, adhesives, paneling, etc. unless finishes noted to be retained.
b) Make good all existing finishes where new work joins.
c) All existing and new walls and previously painted finishes to be re-painted.
d) Remove all metal grilles, to be cleaned and re-painted for re-use where indicated.
e) All heating units, recessed convectors, grilles, pipes, access panels, hangers and miscellaneous exposed metal work (other than stainless steel, anodized aluminum and baked enamel) to be painted to match the surfaces on which they occur, unless otherwise directed by Architect.
f) All exposed structural steel and mechanical ducts in finished areas to be painted.
g) Existing floor finishes to be removed. Make good subfloor to receive new finishes.
h) All hollow metal door frames, guard rails, and nosing of steel stairs shall be epoxy painted.
i) All masonry and drywall shall be extended to u/s steel deck to provide fire rated separations as noted on drawings.
Where walls run parallel and under OWSJ, the OWSJ shall be enclosed both sides with gypsum board to provide rated separations and sound barrier between rooms.
j) All exposed concrete floor surfaces finished with sealer.
k) All exposed concrete block corners shall be bull nose block.

HARDWARE SCHEDULE

Rivett Architectural Hardware Ltd.
Hardware Schedule

R.S McLaughlin - NEW TECH OFF. - 570 STEVENSON RD N, OSHAWA

Schedule 200626 Date Apr 13/23

Door Number 249 Set Number 1

Set # 1
1 SGLE. DR. # 249 EXISTING CORRIDOR 2000 TO NEW TECH. OFFICE 2249 LHR
1 - 1000 x 2080 x 45 x PSF x HMD x 45 MIN RATED
Qty
3 EA HINGE BB1168-114 X 101-NRP-626
1 EA CLASSROOM LOCK C/W INDICATOR L9071P X 03B X L283-711 X 626
1 EA CLOSER 4040XP X 689
1 EA CONCEALED STOP 105S X 630
OVERHEAD STOP @ 110 DEGREE OPEN
1 EA KICKPLATE 190S X 203 X 963 X 630

LIMITED DESIGNATED SUBSTANCE SURVEY REPORT (Building Finishes Upgrades Project)

*NOTE:

1. The following documents for designated substance survey have been prepared by the Durham District School Board and their Environmental Consultant.

HAZARDOUS MATERIALS REPORT

1. **CONTENTS**

1.1 Report

1.1.1 LIMITED DESIGNATED SUBSTANCE SURVEY REPORT (Phase 2 Building Finishes Upgrades)

RS McLaughlin CVI
570 Stevenson Road North, Oshawa, Ontario. L1J 5P1

dated: March 1, 2023

Prepared by: Maple Environmental Inc

Performed for: Durham District School Board

Guideline – Silica on Construction Projects (issued by Ministry of Labour – Province of Ontario)
Contractor may obtain document from the Ministry of Labour web site at:
https://www.labour.gov.on.ca/english/hs/pubs/silica/

1.2 **ENVIRONMENTAL**

1.3 The work under this contract shall not start before the abatement of the hazardous materials is finished. All architects, consultants, contractors and subcontractors shall familiarize themselves with the location of asbestos-containing materials by reviewing the asbestos survey. If any asbestos is found during the work under this contact where there is the possibility of disturbance of the asbestos-containing material(s), the Contractor shall stop all work and immediately consult with the Architect.

1.4 The Contractor is to deal with asbestos in strict accordance with requirements of the Asbestos Regulations 278/05 made under the Occupational Health and Safety Act including any subsequent amendment to these Ontario Regulations.

1.5 The report, by its nature, cannot reveal all conditions that exist or can occur on the site. Should suspected materials-containing hazardous materials be encountered or likely to be disturbed during the course of construction, the work is to be stopped, the suspect area is to be covered and the Contractor is to contact the Environmental Consultant or the Board immediately. The Board will direct the process for remedial action.

1.6 Unidentified materials suspected of containing hazardous materials discovered in the course of the Work shall be treated as hazardous materials containing or confirmed by bulk analysis to be non-hazardous materials prior to disturbance, removal or handling.

1.7 Observe the requirements of the Ministry of Labour Regulation 654/85 or the Toronto District School Board hazardous materials work procedures for all work involving the disturbance, removal or handling of hazardous materials.

2. **HAZARDOUS MATERIALS: GENERAL**

2.1 Other Designated Substances:

HAZARDOUS MATERIALS REPORT

Designated substances other than asbestos may be present on this project. Refer to the Designated Substance List for the designated substances present at the site.
Other materials that may be present in the area of construction may include any or all of the following and would be expected in normal construction:

.1 Lead found in paint films, in solder or pipe for drinking water, in solder for other pipe or electrical components;
.2 Mercury found in elemental form in an ampoule in thermostats or in electrical soft switches, as a gas in fluorescent light tubes or in paint films and caulk; and
.3 Silica, primarily as Quartz, bound in building materials including but not limited to concrete, brick and block.
.4 Also note avoidance of other products noted below.
.5 In accordance with the Ontario Health and Safety Act and regulations enacted under the Act the Contractor and sub-trades shall take appropriate precautions for the building and their work force. Such precautions may include for the substances listed following:

Lead:

I. Any operation involving lead-based paints may potentially produce significant exposures to lead if adequate controls are not provided. Exposure varies with the type of operation being employed.
II. The presence of lead in building finishes left intact or found peeling in a few locations produces little exposure for workers to lead through contact, inhalation or ingestion.
III. Operations involving the hand sanding and scraping of lead based paints can elevate exposure through inhalation. The use of a negative pressure respirator equipped with high efficiency particulate air (HEPA) filters is recommended to reduce exposure.
IV. Operations involving the machine sanding or abrasive cutting of paint and other surface coatings containing lead can elevate levels of much finer dust. The spray application of a lead bearing paint or coating produces a respirable fume. These operations increase the likelihood of exposure by inhalation. A negative pressure air-purifying respirator equipped with HEPA filters is recommended for these operations.
V. Operations involving oxyacetylene torches or other heating operations produces the most significant exposure to lead in particular through inhalation and by contact of lead fumes solidifying on skin. A powered air-purifying respirator equipped with HEPA filters and full body covering is recommended for these operations.
VI. Lead found in solder of other pipe systems and electronic components poses no threat to the work force by inhalation, ingestion or by contact with the exception of maintenance or renovation activities. The maintenance of the pipe or electrical component may produce some exposure to lead fume during the sweating on of lead solders but for a short duration of time. Inhalation is the source of entry and exposure is not very significant.
VII. All items identified in this section may be disposed of as regular non-hazardous waste unless concentrated. Metallic lead may be reclaimed through scrap metal dealers.

Mercury

.1 Fluorescent light tubes contain small quantities of mercury gas. These sealed units do not pose any harm in the workplace except in the case of breakage. There are no liquid or residue present after breakage and spill cleaning is not a concern. A recommended practice is to evacuate the work area when breakage occurs. The gas will diffuse in about five to ten minutes and cleanup of the tubes can be performed. Mercury can be taken into the body by inhalation only from this source.
.2 The same precautions as those indicated for lead-based paints would apply to mercury in paints.

.3 Elemental mercury found in ampoules in electrical equipment may be disposed of as regular waste and should be turned over to the Board for disposal through commercial recyclers; Contractor is to collect tubes, box, for disposal without breaking. The other forms (light tubes and painted surfaces that have not been concentrated) can be disposed of as regular waste.

Silica

.1 Silica is presumed to be present in cement, cement blocks, bricks and mortar of the building. Unless the silica in these materials is reduced to respirable size (5 um or less) and the airborne concentration exceeds the time weighted average exposure of 0.2 milligrams per cubic metre in air, no adverse health effects are expected to occur. Building construction, renovation or demolition do not normally raise excessive exposure to silica with the exception of jack hammering, dry saw cutting or sand blasting. There is little likelihood for the work force to be exposed to excessive levels of respirable silica dust if the material is suppressed with water spray or flow. Respiratory protection is dependent on the type and airborne concentration of respirable silica present in the particular work environment.

2.2 Prior to the disposal of building materials a leachate toxicity test in compliance with Waster Management Regulation (Revised Regulation of Ontario 1990 / Regulation 347) may be required by the local waste receiving site or the Ontario Ministry of Environment and Energy. Prior to disposal these authorities should be consulted with and tests performed where required.

2.3 Where a friable building material **enclosed in a wall, floor or ceiling** such as fireproofing, insulation on pipe or ducts etc. (that is not fibrous glass) or an acoustical textured material (stucco) or a non-friable material such as cement board or cement pipe. The Contractor or his sub-trades shall stop all work and contact the Board’s Hazardous Materials Consultant for this project further direction.

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

LIMITED DESIGNATED SUBSTANCE SURVEY REPORT
(Phase 2 - Building Finishes Upgrades)

R.S. McLaughlin CVI
570 Stevenson Road North,
Oshawa, Ontario

Presented to:
Durham District School Board
400 Taunton Road East
Whitby, Ontario
L1R 2K6

Attention: Rick Racioppa

March 1, 2023

Maple Project No. 20771

482 South Service Rd. E. • Suite 116 • Oakville • Ontario • L6J 2X6 • Tel: 905-257-4408 • Fax: 905-257-8865
www.MapleEnvironmental.com

EXECUTIVE SUMMARY

Maple Environmental Inc. ('Maple') was retained by the Durham District School Board ('DDSB') to perform a survey for Designated Substances as well as polychlorinated biphenyls (PCBs) and mould within the selected areas of R.S. McLaughlin CVI located at 570 Stevenson Road North, Oshawa, Ontario (the 'Site'). It is our understanding that the building requires a survey to identify possible hazardous building materials that may be disturbed during the renovations of the selected areas.

The survey was limited to the Dark Room (Room 2249), Classroom (Room 2250), Weight Room (Room 2253), Wood Shop (Room 2255), Welding Shop (Room 2256), Control Room (Room 2258A) and Work Room (Room 2266), as indicated by the Drawings provided by DDSB for the Building Finishes Upgrades Project Phase 2.

Asbestos

Asbestos-containing materials (ACM) identified within the Surveyed Areas at the time of the assessment are as follows:

- Pipe Insulation (Parging Cement Fittings and Pipe Straights);
- Tar insulation on Dust Collector Duct; and
- 1' x 1' Acoustic Ceiling Tile; and
- Grey 9" x 9" Vinyl Floor Tiles.

It should be noted that due to the presence of solid walls and ceilings (i.e. masonry walls and above solid ceilings) throughout the survey area, access for viewing within the wall and ceiling cavities was not always possible. Suspect asbestos-containing materials may be present within wall and ceiling cavities that were not identified in this report but are suspected to be present. Caution should be taken when demolishing solid walls and ceilings within the areas being surveyed.

Lead

Bulk samples collected of the predominant paint colours indicate that the brown paint on dust collector is "Lead-Containing". The balance of paints sampled are considered to be "Low-Level Lead" (virtually safe).

It should be noted that lead may also be present in wiring connectors, electric cable sheathing, solder joints on copper piping, ceramic glazes, lead sheeting, masonry mortar, and as sub-surface layers to the most recent paint layers currently applied, where present at the Site.

Mercury

Mercury vapour is present in all fluorescent light tubes. Liquid mercury is also present in thermostatic switches located within the surveyed area.

Silica

Free crystalline silica, present as common construction sand, is present in all concrete and masonry products where present within the surveyed areas.

Mould

No visible mould was observed within the surveyed areas at the time of the assessment.

Staining was observed on ceiling tiles and drywall ceilings within various areas of the surveyed area.

It is possible that mould growth is present in concealed areas such as wall or ceiling cavities, pipe chases, etc. or in areas not currently assessed by Maple. The client should notify Maple should any water damage or suspect mould growth be discovered.

PCBs

The fluorescent lamp fixtures observed contained T8 fluorescent light tubes. T8 fixtures have electronic ballast and are considered as not containing PCB.

RECOMMENDATIONS

Based on the Laboratory Analytical Results and observations made on Site, Maple provides the following recommendations.

- Remove all asbestos-containing materials using the appropriate asbestos abatement procedures as outlined in Section 5.0 prior to the planned renovation.
- Disturbance of paints that are considered “Lead-Containing” or “Low-Level Lead” paint finishes (0.1% or less) should be completed using Lead Abatement Procedures as appropriate in accordance with EACC and Ministry of Labour Guidelines as outlined in Section 5.0 prior to the planned renovation.
- Remove all mercury containing components (including fluorescent light tubes) prior to renovations if the materials are being removed. These components should be removed intact and disposed of appropriately.
- Proper dust suppression techniques and other safety precautions to control possible generation of silica dust from the demolition of concrete and masonry products present in the surveyed area should follow those outlined in the Ministry of Labour Guideline- Silica on Construction Projects, 2004.
- Using Level 1 Mould Remediation Procedures, consider removal and replacement of the stained ceiling tiles present in the surveyed areas.
- Should light fixtures containing ballasts be removed as part of the project, all ballasts not clearly marked as “non-PCB” on the label should be separated, handled and disposed of as PCB-containing or inspected by competent persons to ascertain PCB content.

Appropriate procedures for lead, mercury and silica must be observed if these materials are likely to be disturbed by scheduled renovations. Please refer to Section 5.0 of the report to review the required procedures.

Consideration should be given to assessing other areas of the building that could be associated with the current project, including travel path, mechanical or electrical ties in the areas outside of the immediate project area, and penetrations through the slab impacting floors below or above.

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1.0 INTRODUCTION

Maple Environmental Inc. ('Maple') was retained by the Durham District School Board ('DDSB') to perform a survey for Designated Substances as well as polychlorinated biphenyls (PCBs) and mould within the selected areas of R.S. McLaughlin CVI located at 570 Stevenson Road North, Oshawa, Ontario (the 'Site'). It is Maple's understanding that the selected areas of the building require a survey to identify possible hazardous building materials that may be disturbed during the renovations of the areas surveyed.

The survey was limited to the Dark Room (Room 2249), Classroom (Room 2250), Weight Room (Room 2253), Wood Shop (Room 2255), Welding Shop (Room 2256), Control Room (Room 2258A) and Work Room (Room 2266), as indicated by the Drawings provided by DDSB for the Building Finishes Upgrades Project Phase 2.

Section 30 of the Ontario Occupational Health and Safety Act requires that the following Designated Substances be included in a Designated Substance Survey:

Asbestos
Lead
Mercury
Silica
Isocyanates
Vinyl Chloride Monomer
Benzene
Acrylonitrile
Coke Oven Emissions
Arsenic
Ethylene Oxide

Additional detailed information with respect to asbestos was collected at the time of the survey to ensure compliance with Ontario Regulation 278/05.

The assessment was performed by Richards Reboks of Maple on January 31, 2023.

2.0 APPLICABLE ONTARIO REGULATIONS

Applicable Ontario Regulations for each of the materials included in the investigation are briefly described below.

2.1 Designated Substances and Other Hazardous Materials

Section 30 of the Occupational Health and Safety Act requires building owners or their agents (architects, general contractors, etc.) to prepare or have prepared a Designated Substance report for specified potentially hazardous materials possibly present in a facility. The owner must ensure that a prospective constructor has received a Designated Substance report before entering into a binding contract with the contractor. The owner is liable to the contractor for damages and costs arising from unreported materials (of which the owner should reasonably have been aware) and could also be subject to orders and fines from the Ministry of Labour.

The disturbance of asbestos materials on construction projects is controlled by Ministry of Labour Regulation R.R.O. 2005/278. The disposal of asbestos waste is controlled by Ministry of Environment Regulation, R.R.O. 1990/347.

There are no specific Ministry of Labour regulations for control of the other Designated Substances on construction projects. However, the Ministry of Labour actively enforces the general duty clause of the Health and Safety Act which protects workers and provides guidance on exposure monitoring, permissible exposure levels, medical monitoring, etc. for all Designated Substances.

Although Regulations exist for many of the Designated Substances, they apply to industry settings using Designated Substances in manufacturing processes, and do not apply to general property management, renovation or maintenance of buildings.

Polychlorinated Biphenyls ("PCBs") and mould were also included in the investigation, which are not specifically named as Designated Substances. No specific regulations are attached to these materials but are generally governed by the due diligence section of the Health and Safety Act for employers to protect their workers.

2.2 Ontario Regulation 278/05 (Asbestos)

Ontario Regulation 278/05 applies to buildings with regards to maintenance, renovations or demolition work where asbestos-containing materials (ACM) is present and may be disturbed. The Regulation requires that a detailed asbestos inventory be performed in all buildings where friable and non-friable asbestos materials are present. The inventory must be available at the work place and must identify the type of asbestos, and location of asbestos on a room-by-room basis. The following report meets or exceeds the requirements for an asbestos survey under Ontario Regulation 278/05.

In addition, the regulation requires all buildings where asbestos has been used as part of the building to implement an Asbestos Management Program (AMP).

2.3 Ontario Regulation 347

Ontario Regulation 347 applies to the transport of waste from the location of generation to a landfill site authorized to receive specific wastes. The regulation also prescribes procedures on how the specific wastes are to be handled at the landfill site.

The major requirements of the building owner and the person(s) removing the waste are to ensure that:

- The waste is appropriately packaged and labelled;
- The transport vehicle is appropriately placard; and
- The waste is to be transported as directly as possible to the landfill site once it leaves the site.

Some wastes require the owner to register a Generator (of waste) number and many wastes require classification that can restrict or even prohibit their disposal in landfill.

It is important to note that the building owner can be held responsible for the waste until the waste disposal site accepts it.

2.4 Ontario Regulation 362

Ontario Regulation 362, made under the Ontario Environmental Protection Act applies to the waste management and transport of PCB waste from the location of generation to a landfill site authorized to receive specific wastes. The regulation also prescribes procedures on how the specific wastes are to be handled at the landfill site.

3.0 SURVEY SCOPE AND METHODOLOGY

The survey was limited to the Dark Room (Room 2249), Classroom (Room 2250), Weight Room (Room 2253), Wood Shop (Room 2255), Welding Shop (Room 2256), Control Room (Room 2258A) and Work Room (Room 2266), as indicated by the Drawings provided by DDSB for the Building Finishes Upgrades Project Phase 2. The methodology included the assessment for hazardous materials and how the assessment was performed is outlined below.

In order to determine the location of materials included in the assessment, the project technologist entered the room where practical (i.e. where access was possible without the demolition of walls, roof or ceilings or destruction of flooring). Representative views were made above accessible suspended ceiling systems. Cavities within solid ceiling and wall systems were accessed via existing access panels only. The inventory did not include demolition of building systems or finishes to check on possible hidden conditions.

3.1 Asbestos-Containing Building Materials (ACM)

The scope of the survey included all friable asbestos products and all major non-friable asbestos materials. The term friable is applied to a material that can be readily reduced to dust or powder by hand or moderate pressure. Asbestos materials that are friable have a much greater potential to release airborne asbestos fibres when disturbed.

Typical friable asbestos materials include: sprayed fireproofing or thermal insulation, textured (stippled) plaster, and thermal mechanical insulation. Typical non-friable materials include: asbestos cement (transite) products, vinyl floor tiles, asbestos textiles and gaskets. Additional materials such as ceiling tiles, drywall joint compounds and vinyl sheet flooring are classified as non-friable, but because of their ability to release dust when disturbed are considered as “potentially friable” for the purpose of this report.

Bulk samples of materials suspected to contain asbestos were collected for analysis during the survey. Specifically, a small volume of material was removed either from a damaged section of suspect material or taken from intact material. In these latter cases, the material from which the sample was collected was sealed with tape to temporarily prevent fibre release. Samples were placed in plastic bags and sealed until receipt by an independent laboratory. To ensure quality results, the independent laboratory chosen successfully participates in an "Asbestos Proficiency Analytical Testing Program". As such, these independent laboratories are responsible for their findings.

Bulk samples were collected in accordance with regulatory sampling requirements and with sufficient frequency to obtain a general pattern of asbestos use within the building. Due to building renovations or modifications that may have occurred in the past, the consistency of the application of asbestos materials may not be uniform throughout the entire Site. It is important to note that without sampling each individual wall, pipe section, ceiling tile etc. it is not possible to identify the asbestos content of every material present in the selected areas. For this reason, visually similar materials are considered to be homogenous with those already sampled elsewhere in the building without additional analysis.

O. Reg. 278/05 prescribes that a minimum number of samples be collected of materials suspected to contain asbestos. These minimum sampling requirements are summarized in Table 1, below.

Table 1 - Suspect ACM Bulk Sampling Requirements

Type of Material	Quantity of Material Present	Minimum # of Bulk Samples Required
Surfacing Materials (i.e. sprayed fireproofing, drywall joint compound, texture coat, and plaster)	Up to 90 sq. m. (1000 sq. ft.)	3
	From 90 sq. m. (1000 sq. ft.) to 450 sq. m. (5000 sq. ft.)	5
	Greater than 450 sq. m. (5000 sq. ft.)	7
All other potential ACM	Any	3

Excluding surfacing materials, the laboratory was instructed to cease analysis within Sample Groups of homogenous materials when one of the samples in the group is found to contain asbestos. For example, if three samples of a type of vinyl floor tile are collected (as required by O. Reg. 278/05) and submitted for analysis and the first sample is positively identified as containing asbestos, the balance of the sample group is not analysed.

EMC Scientific Inc. ('EMC'), an independent laboratory, was selected to analyse the collected bulk suspect asbestos samples. EMC successfully participates in an "Asbestos Proficiency Analytical Testing Program" and as such, is responsible for its findings. EMC followed the Code of Practice for the identification of asbestos in bulk material, as detailed in O. Reg. 278/05. Bulk samples were analysed using the Polarized Light Microscopy ("PLM") Technique with Dispersion Staining. The identification of asbestos fibre in bulk material is based on a collective set of parameters dependent on the unique shape and crystallographic properties of each fibre as viewed through the microscope.

This method is useful for the qualitative identification of asbestos and the semi-quantitative determination of asbestos content in bulk materials expressed as a percent of projected area. The method identifies types of asbestos and also measures percent of asbestos as perceived by the analyst in comparison to standard area projections or trained experience.

The recommendations made as part of this report with respect to asbestos have taken into consideration: the condition and accessibility of the material, vibration, air movement, and general activities likely to occur within the vicinity of the ACM.

In each area or room inventoried, the technician recorded the quantity, condition (GOOD, FAIR, or POOR) of each suspect asbestos-containing material.

The definitions for condition and accessibility of the asbestos-containing items are as follows:

GOOD Material is intact with no visible signs of damage.

FAIR Material is visibly damaged but can be repaired.

POOR Material is damaged beyond repair and likely needs to be removed.

Where ACM is found to be in GOOD condition and not likely to deteriorate or fall, the general recommendation would be to re-evaluate the condition of the material on an annual basis (required by O. Reg. 278/05). This recommendation can be subject to change if the material is located in a manner that persons untrained in asbestos awareness could physically damage it.

Where ACM is found to be damaged (i.e., FAIR or POOR condition), a recommendation to have the material cleaned-up, repaired, removed, enclosed, or encapsulated is offered. The recommendation will also indicate which asbestos procedure should be used to perform the remedial work (i.e., Type 1, Type 2, Type 3, or Glove Bag Removal Methods).

3.2 Lead

The investigation included the collection and analysis of all major paint colour applications for the presence of lead in the paint. Other materials that possibly contain lead were identified by known historic use, where relevant. The lead in paint samples were analysed by EMSL Canada ('EMSL'), using atomic absorption spectrophotometry. EMSL is AIHA (American Industrial Hygiene Association) and NIOSH (National Institute of Occupational Safety and Health) accredited for this type of analysis. The Laboratory Analysis Report for lead in paint samples is included with this Report as Appendix II.

3.3 Mercury

The assessment included a visual identification of fluorescent light tubes, switches, electrical controls, heating system thermostats, thermometers, and other components historically known to contain mercury.

3.4 Other Designated Substances

Other materials listed in Section 1.0 of this Report were identified on a visual basis where present, as part of the current assessment. It should be noted that no manufacturing or heavy industrial activities are known by Maple to occur at the Site. Therefore, Designated Substances associated with these activities (i.e. those other than Asbestos, Lead, Mercury, and Silica) would not be expected to be present in the selected areas.

3.5 Mould

The assessment for mould was conducted in accordance with standard industry practice as set out in the Canadian Construction Association (CCA) "Mould Guidelines for the Canadian Construction Industry" for a visual assessment. Although there are no regulatory requirements in Ontario for such an assessment, the CCA Guidelines, and similar guidelines from other agencies have been accepted as the industry standard by most experts, consultants, the Ontario Ministry of Labour, and the Canadian Construction Association.

All guidelines and protocols for mould investigations indicate that investigations should be performed largely on a visual basis with limited collection of bulk and/or air samples. The Ontario Ministry of Labour has consistently enforced the removal of all mould from buildings regardless of mould genus or species, and therefore bulk samples or air samples for confirmation of mould are not typically collected for investigative purposes where mould is visible.

3.6 Polychlorinated Biphenyls

Manufacturer's labels/codes collected from fluorescent lamp ballasts suspected of containing Polychlorinated Biphenyls ("PCBs") are compared with Environment Canada's document titled "Identification of Lamp Ballasts Containing PCBs", which identifies PCB-containing ballasts.

3.7 Limitations and Omissions from Scope

Due to the nature of building construction some limitations exist as to the possible thoroughness of any building materials inventory. The field observations, measurements, and analysis are considered sufficient in detail and scope to form a reasonable basis for the findings presented in this report. Maple warrants that the findings and conclusions contained herein have been made in accordance with generally accepted evaluation methods in the industry and applicable regulations at the time of the performance of the inventory.

It is possible that conditions may exist which could not be reasonably identified within the scope of the inventory or which were not apparent during the Site investigation. Maple believes that the information collected during the investigation concerning the property is reliable. No other warranties are implied or expressed.

During a standard ACM inventory performed for the purposes of regulatory compliance, it is industry practice to exclude certain suspect asbestos-containing materials from sampling. These materials are often excluded from sampling due to the risk of compromising the health and safety of the technician, other building occupants, or the integrity of the systems with which these materials are associated. Examples of such materials include; elevator brakes, roofing felts and mastics, Secondary voltage wiring, mechanical packing and gaskets, underground services or piping, fire-doors, window caulking and levelling compound. Where observed, these materials were presumed to be ACM.

3.8 Drawings

Drawings included in Appendix III will indicate the locations of any major applications of an asbestos-containing material with the exception of mechanical insulations, drywall, plaster finishes and transite (which cannot be accurately depicted on drawings). The information depicted on the drawings is not to scale and is only meant to provide a general location of asbestos-containing materials.

3.9 Previous Reports

Where possible, Maple utilized the observations and representative bulk sampling results from previous Survey Reports that were made available at the time of the survey. Maple utilized sampling data from the following sources:

- February 2022 – Maple Environmental Inc. (Maple Project 20015) – Limited Designated Substance Survey Report (Phase 1).
- October, 2017 – Maple Environmental Inc. Project 16312-129 – Detailed Asbestos-Containing Building Materials Survey, and
- April 2017 – Maple Environmental Inc. (Maple Project 16227) – Limited Designated Substance Survey Report.

4.0 INVENTORY FINDINGS

The findings of the survey are presented separately below for each of the eleven Designated Substances as well as microbial growth (mould), and polychlorinated biphenyls. Asbestos is further detailed by typical applications of asbestos.

4.1 Asbestos

The following is a brief discussion of the extent to which ACM was identified in the surveyed area. The discussion is organized under the headings of materials that are generally suspected of containing asbestos. The sample numbers refer to the laboratory analysis report presented as Appendix I and summarised in Table 2 below. Eighteen (18) bulk samples were collected during the current assessment for the determination of asbestos content and submitted to the lab to be analysed. Due to the presence of more than one phase of material in some of the original samples the laboratory may have performed multiple analyses for some samples. In addition, some of the samples may not have been analysed due to the positive confirmation of asbestos in a previous sample of the same material during analysis. As a result, a total of eighteen (18) samples were analyzed.

Table 2 - Summary of Analysis of Asbestos Bulk Samples

Sample No.	Room Number	Substrate	Sample Description	Result
S01A	**Collector**	**Duct**	**Black tar with Fibers**	**5% Chrysotile**
S01B	**Collector**	**Duct**	**Black tar with Fibers**	**Not Analyzed**
S01C	**Collector**	**Duct**	**Black tar with Fibers**	**Not Analyzed**
S02A	2253	Wall	Drywall Joint Compound	None Detected

Sample No.	Room Number	Substrate	Sample Description	Result
S02B	2253	Wall	Drywall Joint Compound	None Detected
S02C	2250	Wall	Drywall Joint Compound	None Detected
S03A	2253	Wall	Masonry Wall Mortar	None Detected
S03B	2253	Wall	Masonry Wall Mortar	None Detected
S03C	2253	Wall	Masonry Wall Mortar	None Detected
S04A	2250	Floor	VFT01 – Grey 12” x 12”, White flecks	None Detected
			Black Mastic	None Detected
S04B	2250	Floor	VFT01 – Grey 12” x 12”, White flecks	None Detected
			Black Mastic	None Detected
S04C	2250	Floor	VFT01 – Grey 12” x 12”, White flecks	None Detected
			Black Mastic	None Detected
S05A	**2266**	**Ceiling**	**AT01– 2’ x 4’, Large and Small Pinhole**	**Chrysotile 1%**
S05B	**2266**	**Ceiling**	**AT01– 2’ x 4’, Large and Small Pinhole**	**Not Analyzed**
S05C	**2266**	**Ceiling**	**AT01– 2’ x 4’, Large and Small Pinhole**	**Not Analyzed**
S06A	**2266**	**Floor**	**VFT02 – Grey 12” x 12”, White flecks**	**Chrysotile 3%**
			Black Mastic	None Detected
S06B	**2266**	**Floor**	**VFT02 – Grey 12” x 12”, White flecks**	**Not Analyzed**
			Black Mastic	None Detected
S06C	**2266**	**Floor**	**VFT02 – Grey 12” x 12”, White flecks**	**Not Analyzed**
			Black Mastic	None Detected

Asbestos-containing materials (ACM) identified within the Surveyed Areas at the time of the assessment are as follows:

- Pipe Insulation (Parging Cement Fittings and Pipe Straights);
- Tar insulation on Dust Collector duct; and
- 1’ x 1’ Acoustic Ceiling Tile; and
- Grey 9” x 9” Vinyl Floor Tiles.

Details are presented below under the headings of the most typical asbestos applications in buildings.

It should be noted that due to the presence of solid walls and ceilings (i.e. masonry block walls and above solid ceilings) throughout the survey area, access for viewing within the wall and ceiling cavities was not always possible. Suspect asbestos-containing materials may be present within wall and ceiling cavities that were not identified in this report but are suspected to be present. Caution should be taken when demolishing solid walls and ceilings within the areas being surveyed.

4.1.1 Sprayed Fireproofing

No sprayed fireproofing was identified within the surveyed area at the time of the assessment.

4.1.2 Thermal Mechanical Insulation (Friable)

Asbestos and non-asbestos mechanical insulations are present throughout the Survey Area. Mechanical insulations are applied to the following systems:

- Pipe Systems (including insulation on pipe fittings and pipe straights);
- Duct Systems; and
- Mechanical Equipment.

Piping Systems

Asbestos and non-asbestos piping systems were identified throughout the Surveyed Areas at the time of the assessment.

Pipe Straights

Layered corrugated paper insulation, known as “Aircell”, was observed in the areas surveyed on several of the domestic hot water piping, and heating supply pipes. Maple had previously sampled the material and was found to contain **70% Chrysotile asbestos** (Sample Set 16227 S02A). The material was observed to be generally in GOOD condition at the time of the assessment.

Layered paper and tar insulation, known as “Cellulose”, was observed in the areas surveyed on several of the cold-water piping, drains, and in some instances on condensate return piping. Maple had previously sampled the material and was found to be non-asbestos (Sample Set 16227 S03A).

All remaining straight sections of pipe insulation observed within the areas surveyed at the time of the assessment were either insulated with non-asbestos fibreglass and PVC or were un-insulated.

Pipe Fittings

Parging cement insulation on pipe fittings (which include elbows, valves, tees, hangers, etc.) was observed on pipe systems throughout the Surveyed Areas. The material was previously sampled by Maple and was found to contain **70% Chrysotile asbestos** (Sample Set 16227-S-01).

The insulation material was observed to be generally in GOOD condition.

All remaining pipe fittings observed are either not insulated or are insulated with non-asbestos horse hair, fibreglass, foam or PVC which are not suspected to contain asbestos.

Duct Systems

The fiberglass insulation present on the duct suppling the Dust Collector outside the Welding Shop (Room 2256) was covered with an asbestos-containing tar-impregnated coating. The body of the Dust Collector was observed to be uninsulated.

Three (3) representative samples (Sample Set 20771 S-01A) of the tar insulation were collected and analyzed for determination of asbestos content. Analysis of Sample Set 20771 S-01 found that the samples contain **5% Chrysotile Asbestos**. Remaining samples of the set were not analyzed due to the "Stop Positive Analytical Protocol" and therefore all of the tar material are considered to be asbestos-containing.

There was approximately fifty (50) square feet of this material observed to be generally in GOOD condition with approximately ten (10) square feet of the material in POOR condition at the time of the assessment.

Remaining duct systems observed within the surveyed area were either not insulated or are insulated with fibreglass which is not suspected to contain asbestos.

Mechanical Equipment

All mechanical equipment were observed within the surveyed area were either not insulated or are insulated with fibreglass which is not suspected to contain asbestos.

4.1.3 Texture Coat Finishes (Friable)

No texture coat finishes were identified within the surveyed areas at the time of the assessment.

4.1.4 Acoustic Ceiling Tiles (Potentially Friable)

Asbestos and non-asbestos acoustic ceiling tile systems were identified within the surveyed areas at the time of the assessment.

Three (3) visually distinct types of ceiling tile systems were observed in the surveyed areas.

A brief description of each type of ceiling tile is outlined below:

- AT-01 (2'x4' Small Pinhole and Fissure Pattern):

  AT-01 was observed to be present in Weight Room (Room 2253).

  No bulk samples of AT-02 were collected as a date stamp manufacture code (01/16/10) was present on the backside of the tile indicating that the tiles were recently manufactured and therefore not suspected to contain asbestos.

- AT-02 (2'x4' Spiral Pinhole and Fissure Pattern):

  AT-02 was observed to be present in the Dark Room (Room 2249), Control Room (Room 2258A), and the Work Room (Room 2266).

  No bulk samples of AT-02 were collected as a date stamp manufacture code (10/20/06) was present on the backside of the tile indicating that the tiles were recently manufactured and therefore not suspected to contain asbestos.

- **AT-03 (1'x1' Large Pinhole Pattern):**

  AT-03 was observed to be present in Tech Room (Room 2266) as a second ceiling.

  Three (3) representative samples (Sample Set 20771 S-05A-C) of AT-03 were collected and analyzed for determination of asbestos content. Analysis of Sample Set S-05A found that the samples contain **1% Amosite Asbestos**. Remaining samples of the set were not analyzed due to the "Stop Positive Analytical Protocol" and therefore all ceiling tiles of this pattern are considered to be asbestos-containing. The material was observed to be generally in GOOD condition at the time of the assessment

4.1.5 Vinyl Sheet Flooring (Potentially Friable)

No vinyl sheet flooring finishes were identified within the surveyed areas at the time of the assessment.

4.1.6 Vinyl Floor Tile (Non-Friable)

No asbestos-containing vinyl floor tiles were identified within the surveyed area at the time of the assessment.

Two (2) visually distinct pattern of vinyl floor tiles were observed within the Surveyed Areas at the time of the assessment. A brief description is outlined below:

- VFT-01 (Blue 12"x12" with White and Grey Flecks)

  VFT-01 was observed in the classroom (Room 2250).

  Three (3) representative samples (Sample Set S-02) of VFT-01 were collected and analyzed for determination of asbestos content. Analysis of Sample Set S-02 found that the samples do not contain asbestos. The black floor mastic associated with the tile was also analyzed as part of the sample set and was found not to contain asbestos.

- **VFT-02 (Grey 9"x9" with White and Grey Flecks)**

  VFT-02 was observed in the Work Room (Room 2266).

  Three (3) representative samples (Sample Set 20771 S-06) of VFT-02 were collected and analyzed for determination of asbestos content. Analysis of Sample Set S-02 found that the VFT02 contained **3% Chrysotile asbestos**.

The black floor mastic associated with the VFT02 was also analyzed as part of the sample set and was found not to contain asbestos.

VFT02 was observed to be in GOOD condition.

4.1.7 Asbestos Cement Products "Transite" (Non-Friable)

No asbestos-containing cement products were identified in the surveyed areas at the time of the assessment.

4.1.8 Drywall Joint Compound (DJC) (Potentially Friable)

No asbestos-containing drywall joint compound finishes were identified within the surveyed area at the time of the assessment.

Interior drywall finishes were present in the form of wall finishes between rooms 2253 and 2250 that may be disturbed.

Three (3) representative samples (Sample Set S-02A-C) of drywall joint compound were collected and analyzed for determination of asbestos content. Analysis of Sample Set S-02 found that samples did not contain asbestos.

4.1.9 Plaster (Potentially Friable)

No plaster finishes were identified within the Surveyed Areas at the time of the assessment.

4.1.10 Vermiculite (Friable)

No vermiculite insulation was observed to be present within the surveyed area at the time of the assessment. It should be noted that loose fill vermiculite insulation can often be present within voids of masonry and possibly some pre-manufactured surveyed area components that would not be identified during the course of this assessment.

4.1.11 Other

Masonry Block Mortar

No asbestos-containing mortar finishes were identified within the surveyed area at the time of the assessment.

Interior wall finishes present between rooms 2253 and 2250 that may be disturbed contained a masonry block wall with the upper section of drywall.

Three (3) representative samples (Sample Set S-03A-C) of mortar finish were collected and analyzed for determination of asbestos content. Analysis of Sample Set S-03 found that samples did not contain asbestos was detected in Sample S01B.

4.2 Lead

Four (4) bulk paint samples were collected for determination of lead content and submitted to EMSL Canada for analysis during the assessment. The sample number refers to the Certificate of Analysis Report presented as Appendix II and summarised in Table 3 below.

Table 3 - Summary of Analysis of Lead-in-Paint Samples

Sample No.	Locations	Sample Description	Result (%)
LBP1	**Dust Collector**	**Brown Paint on Metal Casing**	**0.32**
LBP2	Welding Shop (2256)	White Paint on Masonry Wall	0.062
LBP3	Weight Room (2253)	Green Paint on Masonry Wall	0.042
LBP4	Work Room (2266)	Blue Paint on Masonry Wall	0.057

No regulations currently exist in Ontario defining the lower limit of lead-containing material. The Ontario Ministry of Labour (MOL) has issued a guideline for lead abatement, entitled "*Guideline – Lead on Construction Projects*" (2004) which is considered enforceable. The Guideline does not specify what constitutes a material as "lead-containing". Instead, it outlines procedures based on the concentration of airborne lead encountered during removal, as well as provides procedures and/or specific operations for lead-containing material removal.

However, the Environmental Abatement Council of Canada (EACC) "*Lead Guideline for Construction, Renovation, Maintenance or Repair*" document classifies paint as either "Low-Level", "Lead-Containing", or "Lead-Based" as outlined in Table 4 below.

TABLE 4 - EACC Classification of Lead Paint

Concentration of Lead (%)	Definition
0.1 or less	"Low-Level Lead" (Virtually Safe)
Greater than 0.1 but less than 0.5	"Lead-Containing"
0.5 or greater	"Lead-Based"

Based on these criteria and the results of the sample analysis, the brown painted surface sampled on the Dust Collector is considered to be "Lead-Containing" and the white, blue and green painted finishes on the walls are considered to be "Low-Level Lead" (virtually safe).

4.3 Mercury

Mercury vapour is present in all fluorescent light tubes. Liquid mercury is also present in thermostatic switches located within the surveyed area.

4.4 Silica

Free crystalline silica, present as common construction sand, is present in all concrete and masonry products where present in the Select areas surveyed.

4.5 Isocyanates

Free isocyanate compounds would not be expected to be found in a non-manufacturing facility.

4.6 Vinyl Chloride Monomer

Vinyl chloride monomer would not be expected to be found in a non-manufacturing facility.

4.7 Benzene

Benzene would not be expected to be found in a non-manufacturing facility.

4.8 Acrylonitrile

Acrylonitrile would not be expected to be found in a non-manufacturing facility.

4.9 Coke Oven Emissions

Coke oven emissions would not be expected to be found in a non-manufacturing facility.

4.10 Arsenic

Arsenic would not be expected to be found in a non-manufacturing facility.

4.11 Ethylene Oxide

Ethylene oxide would not be expected to be found in a non-manufacturing facility.

4.12 Mould

No visible mould or water-damaged material was observed in the surveyed areas at the time of the assessment.

There was visible water-staining present on several ceiling tiles within the following surveyed areas:

- Dark Room (Room 2249) – Two (2) tiles;
- Weight Room (Room 2253) – Four (4) tiles;
- Control Room (Room 2258A) – Two (2) tiles; and
- Work Room (Room 2266) – Two (2) tiles.

It is possible that mould growth is present in concealed areas such as wall or ceiling cavities, pipe chases, etc. or in areas not currently assessed by Maple. The client should notify Maple should any water damage or suspect mould growth be discovered.

4.13 Polychlorinated Biphenyls (PCBs)

The fluorescent lamp fixtures observed present in the surveyed areas contained T8 fluorescent light tubes. T8 fixtures have electronic ballast and are considered as not containing PCB.

5.0 RECOMMENDATIONS

5.1 Asbestos

Asbestos-containing materials (ACM) identified within the Surveyed Areas at the time of the assessment are as follows:

- Pipe Insulation (Parging Cement Fittings and Pipe Straights);
- Tar insulation on Dust Collector; and
- 1’ x 1’ Acoustic Ceiling Tile; and
- Grey 9” x 9” Vinyl Floor Tiles.

General recommendations for each of the confirmed asbestos-containing and suspect asbestos-containing materials are as follows.

- Removal or disturbance of ACM mechanical insulations requires the use of Type 2, Type 3 or Glove Bag Asbestos Abatement Procedures as appropriate for the work being performed.
- Removal or disturbance of ACM tar materials requires the use of Type 1 Asbestos Abatement Procedures (provided no power tools are used and the material is wetted). If power tools are required Type 3 Asbestos Abatement Procedures must be applied.
- Removal or disturbance of ACM acoustic ceiling tiles less than 7.5m^2 requires the use of Type 1 Asbestos Abatement Procedures; greater than 7.5m^2 requires Type 2 Asbestos Abatement Procedures.
- Removal or disturbance of ACM vinyl floor tiles requires the use of Type 1 Asbestos Abatement Procedures (provided no power tools are used and the material is wetted). If power tools are required Type 3 Asbestos Abatement Procedures must be applied.

It is important to note that due to the presence of solid wall and ceiling systems, the assessment was not able to confirm or deny the presence of ACM within wall and ceiling cavities. The presence of concealed ACM should be assumed as well as within rooms that were not accessible during the assessment. It is possible that ACM is present that was not identified in this report.

5.2 Lead

The brown paint finish on the Dust Collector is “Lead-Containing” and should follow appropriate procedures if disturbed or removed.

Disturbance of paints that are considered "Lead-Containing" should be completed using Lead Abatement Procedures as appropriate in accordance with EACC and Ministry of Labour Guidelines. These Lead Abatement Procedures are generally as follows:

- Class 1 Lead Abatement Procedures (removing paint by means of chemical stripper or heat gun, removal of lead sheeting);
- Class 2A Lead Abatement Procedures (removal of lead paint using power tools equipped with HEPA vacuum attachment, removal by scraping or sanding using non-powered hand tools, or manual demolition of plaster finishes);
- Class 3A Lead Abatement Procedures (removal using power tools, welding or torching; and
- Class 3B Lead Abatement Procedures (for abrasive blasting).

The remaining paint finishes sampled from the various wall finishes were found to be "Low-Level Lead" (0.1% or less) and considered virtually safe provided that:

- airborne lead concentrations are kept below 0.05 mg/m^3;
- general dust suppression and worker hygiene procedures are utilized; and
- torching or other activities that create fumes are not completed.

5.3 Mercury

Mercury vapour is present in all fluorescent light tubes. All fluorescent light tubes should be handled and disposed of appropriately.

5.4 Silica

Proper dust suppression techniques and other safety precautions to control possible generation of silica dust from the demolition of concrete and masonry products present in the building should follow those outlined in the Ministry of Labour Guideline- Silica on Construction Projects, 2004.

5.5 Mould

Using Level 1 Mould Remediation Procedures in accordance with EACC Guidelines, consider the removal and replacement of the water-stained ceiling tiles present in the surveyed areas.

6.0 LIMITATIONS

Due to the nature of building construction some limitations exist as to the possible thoroughness of the subject investigation. The field observations are considered sufficient in detail and scope to form a reasonable basis for the findings presented in this report. Maple warrants that the findings and conclusions contained herein have been made in accordance with generally accepted evaluation methods in the industry and applicable regulations at the time of the performance of the assessment.

It is possible that conditions may exist which could not be reasonably identified within the scope of the investigation or which were not apparent during the site investigation. Maple believes that the information collected during the investigation period concerning the property is reliable. No other warranties are implied or expressed.

Information provided by Maple is intended for Client use ONLY. Any use by a third party, of reports or documents authored by Maple, or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Maple accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted.

The liability of Maple or its staff will be limited to the lesser of the fees paid or actual damages incurred by the Client. Maple will not be responsible for any consequential or indirect damages. Maple will only be liable for damages resulting from negligence of Maple; all claims by the Client shall be deemed relinquished if not made within two years after last date of services provided.

Please contact Maple Environmental Inc. at (905) 257-4408 for inquiries regarding this project.

MAPLE ENVIRONMENTAL INC.
Environment, Health and Safety Consultants

Prepared By:

Richards Reboks
Senior Project Technologist

Reviewed By:

Kyle Prosser
Senior Project Manager

APPENDIX I

LABORATORY ANALYSIS REPORT – ASBESTOS

emcscientific
INCORPORATED

Laboratory Analysis Report

To:

Richards Reboks
Maple Environmental Inc.
482 South Service Road East, Suite 116
Oakville, Ontario
L6J 2X6

EMC LAB REPORT NUMBER: A88037
Job/Project Name: DDSB, MCUI, SHOPS
Analysis Method: Polarized Light Microscopy – EPA 600
Date Received: Feb 6/23 **Date Analyzed:** Feb 13/23
Analyst: Chengming Li
Reviewed By: Malgorzata Sybydlo

Job No: 20771
Number of Samples: 18
Date Reported: Feb 13/23

Client's Sample ID	Lab Sample No.	Description/Location	Sample Appearance	SAMPLE COMPONENTS (%)			
				Asbestos Fibres		Non-asbestos Fibres	Non-fibrous Material
S01A	A88037-1	Tar wrap on hopper duct	Black, tar with fibres	**Chrysotile**	**5**	25	70
S01B	A88037-2	Tar wrap on hopper duct	NA	**NA**			
S01C	A88037-3	Tar wrap on hopper duct	NA	**NA**			
S02A	A88037-4	DJC – wall in 2253	White, joint compound	**ND**			100
S02B	A88037-5	DJC – wall in 2253	White, joint compound	**ND**			100
S02C	A88037-6	DJC – wall in 2250	White, joint compound	**ND**			100
S03A	A88037-7	Mortar – masonry wall in Rm 2203	Grey, cementitious material	**ND**			100
S03B	A88037-8	Mortar – masonry wall in Rm 2203	Grey, cementitious material	**ND**			100
S03C	A88037-9	Mortar – masonry wall in Rm 2203	Grey, cementitious material	**ND**			100
S04A	A88037-10	VF701 – blue 12"x12" VFT, Rm 2250	2 Phases: a) Blue, vinyl floor tile b) Black, mastic	 **ND** **ND**			 100 100
S04B	A88037-11	VF701 – blue 12"x12" VFT, Rm 2250	2 Phases: a) Blue, vinyl floor tile b) Black, mastic	 **ND** **ND**			 100 100
S04C	A88037-12	VF701 – blue 12"x12" VFT, Rm 2250	2 Phases: a) Blue, vinyl floor tile	 **ND**			 100

EMC LAB REPORT NUMBER: A88037
Client's Job/Project Name/No.: 20771
Analyst: Chengming Li

Client's Sample ID	Lab Sample No.	Description/Location	Sample Appearance	SAMPLE COMPONENTS (%)			
				Asbestos Fibres		Non-asbestos Fibres	Non-fibrous Material
			b) Black, mastic	**ND**			100
S05A	A88037-13	A703 – 1'x1' tile – Rm 2266	Grey, ceiling tile	**Amosite**	**1**	75	24
S05B	A88037-14	A703 – 1'x1' tile – Rm 2266	NA	**NA**			
S05C	A88037-15	A703 – 1'x1' tile – Rm 2266	NA	**NA**			
S06A	A88037-16	VF702 – grey 9"x9", Rm 2266	2 Phases: a) Grey, vinyl floor tile b) Black, mastic	 **Chrysotile** **ND**	 **3**		 97 100
S06B	A88037-17	VF702 – grey 9"x9", Rm 2266	2 Phases: a) NA b) Black, mastic	 **NA** **ND**			 100
S06C	A88037-18	VF702 – grey 9"x9", Rm 2266	2 Phases: a) NA b) Black, mastic	 **NA** **ND**			 100

Note:
1. Bulk samples are analyzed using Polarized Light Microscopy (PLM) and dispersion staining techniques. The analytical procedures are in accordance with EPA 600/R-93/116 method.
2. The results are only related to the samples analyzed. **ND** = None Detected (no asbestos fibres were observed), **NA** = Not Analyzed (analysis stopped due to a previous positive result).
3. This report may not be reproduced, except in full without the written approval of EMC Scientific Inc. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.
4. The Ontario Regulatory Threshold for asbestos is 0.5%. The limit of quantification (LOQ) is 0.5%.
5. Vinyl floor tiles may contain very fine asbestos fibres which the PLM method cannot detect. TEM analysis may be necessary to confirm the absence of asbestos.

APPENDIX II

LABORATORY ANALYSIS REPORT – LEAD

EMSL Canada Inc.
2756 Slough Street, Mississauga, ON L4T 1G3
Phone/Fax: (289) 997-4602 / (289) 997-4607
http://www.EMSL.com torontolab@emsl.com

EMSL Canada Or	552301667
CustomerID:	55MAPL78
CustomerPO:	20771
ProjectID:	

Attn: **Richard Reboks**
Maple Environmental, Inc.
482 South Service Road East
Suite 116
Oakville, ON L6J 2X6

Phone:	(905) 257-4408
Fax:	(905) 257-8865
Received:	2/6/2023 09:00 AM
Collected:	1/31/2023

Project: **20771 DDSB, MCVI DSUB**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

Client SampleDescription	*Collected*	*Analyzed*	*Weight*	*RDL*	*Lead Concentration*
LBP1	1/31/2023	2/6/2023	0.2444 g	0.0082 % wt	0.32 % wt
552301667-0001	Site: 2256 - Brown Paint on Hopper				
LBP2	1/31/2023	2/6/2023	0.2500 g	0.0080 % wt	0.062 % wt
552301667-0002	Site: 2256 - Off-White Masonry				
LBP3	1/31/2023	2/6/2023	0.2508 g	0.0080 % wt	0.042 % wt
552301667-0003	Site: 2253 - Green Paint on Masonry				
LBP4	1/31/2023	2/6/2023	0.2520 g	0.0080 % wt	0.057 % wt
552301667-0004	Site: 2266 - Blue Paint on Wall				

Rowena Fanto, Lead Supervisor
or other approved signatory

* Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.008% wt based on the minimum sample weight per our SOP. "<" (less than) result signifies the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. Definitions of modifications are available upon request.
Samples analyzed by EMSL Canada Inc. Mississauga, ON AIHA LAP, LLC-ELLAP Accredited #196142

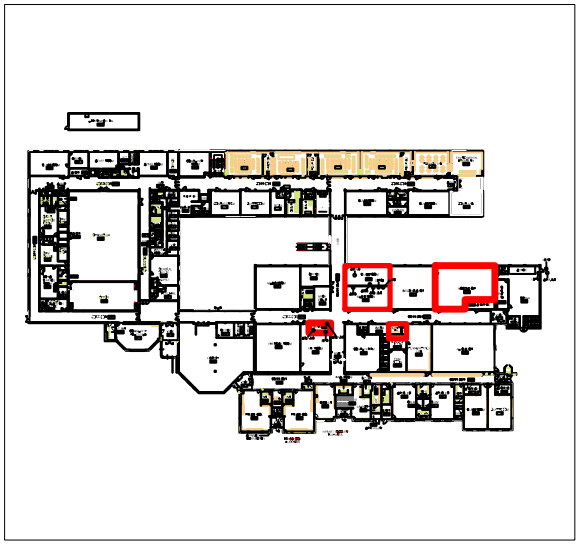
Initial report from 02/13/2023 08:10:00

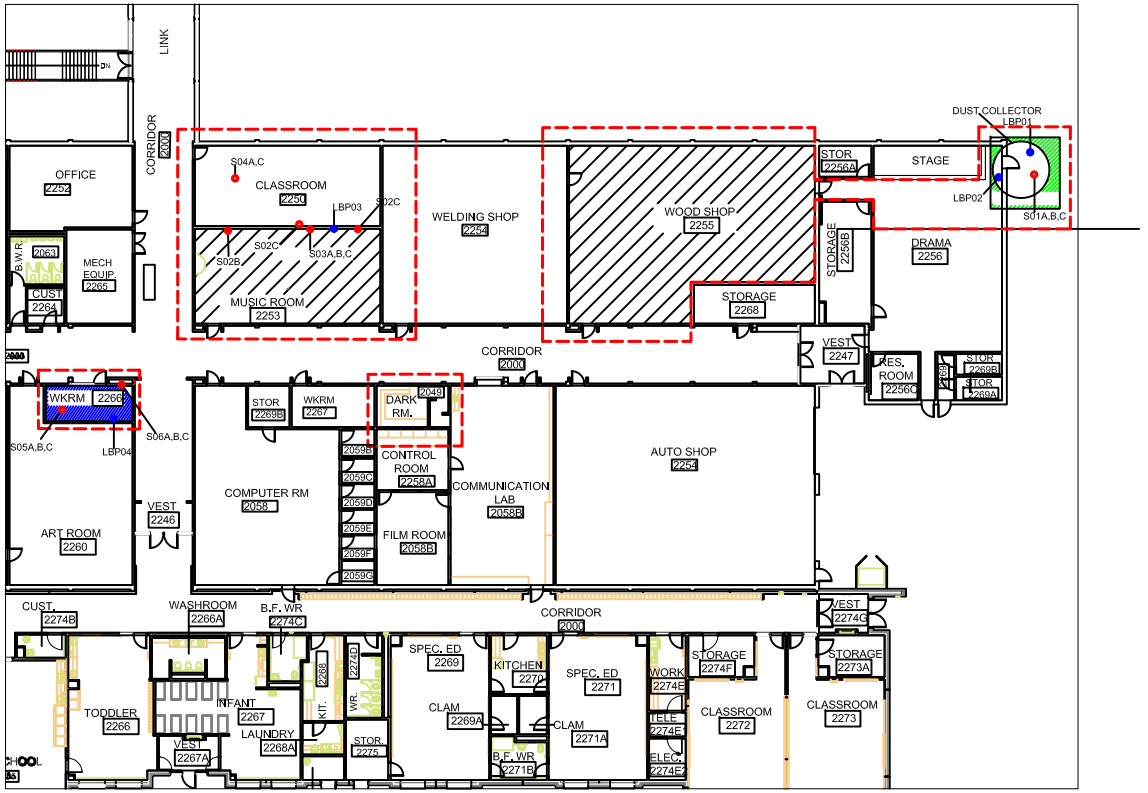
APPENDIX III

DRAWINGS

Note:

1. "Lead Containing" Paint present on exterior of Dust Collector.
2. 1'x1' acoustic ceiling tiles present above lay-in tiles in Room 2266 are Asbestos-containing.
3. Water-Stained lay-in acoustic ceiling tiles present in various locations.





MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

482 South Service Rd. E. - Suite 116
Oakville - Ontario - L6J-2X6
Tel: (905) 257 4408 - Fax: (905) 257 8865

www.MapleEnvironmental.com

PROJECT NO.: 20771

Drawn By: Y.Shah

Checked By: R.Reboks

Legends

SYMBOL	DESCRIPTION
	ASBESTOS BULK SAMPLE: S-##
	LEAD BULK SAMPLE: LBP-##
	SURVEY AREA
	VINYL FLOOR TILES AND ACOUSTIC CEILING TILES
	MECHANICAL INSULATION
	INSULATION OF DUST COLLECTOR SURVEY AREA

CONFIRMED ACM

SYMBOL	DESCRIPTION
NOTE	ACOUSTIC CEILING TILES

Limited Designated Substance Survey

DDSB

R.S. McLaughlin CVI
570 Stevenson Road N,
Oshawa, Ontario
First Floor Plan

SCALE: NTS

SHEET: DS-01

February 27, 2023

GENERAL REQUIREMENTS

These General Requirements shall form a part of and be read in conjunction with each section of the Specification

1 GENERAL CONDITIONS

Work of this Contract comprises the construction of:

R.S. McLaughlin C.V.I
Renovations Phase 2
570 Stevenson Road North
Oshawa, Ontario. L1J 5P1

2 GENERAL REQUIREMENTS

2.1 All Contractors shall carefully examine the site and all drawings and specifications to inform themselves fully of all conditions and limitations pertaining to the work of the contract.

2.2 All Contractors shall co-operate and co-ordinate their work for the proper completion of the work, including co-ordination of delivery dates and commencement of subtrades work.

2.3 The responsibility for all work, including temporary structures, shoring and erection shall at all times rest with the General Contractor and Subcontractors. The Consultant will review construction methods and shop drawings for general arrangements only. The method of obtaining the results contemplated by the Contract Documents shall be determined by the General Contractor.

2.4 The undertaking of periodic site review by the Consultant or Board Representative shall not be construed as supervision of actual construction, nor make them responsible for providing a safe place for work, visit, use, access, travel, or occupancy of the Consultant's or Board's employees or agents.

2.5 The General Contractor shall be fully responsible for coordinating and expediting the work of all Subcontractors and shall employ the necessary and qualified personnel to provide the required quality of labour and materials and to prevent delays in the progress of the project. Each trade shall be afforded all reasonable opportunities for the installation of its work and for the storage and handling of its materials.

3 COORDINATION

3.1 The General Contractor shall coordinate all work and preparation on which subsequent work depends to facilitate mutual progress, and to prevent any conflict.

3.2 The General Contractor shall ensure that each trade makes known, for the information of the General Contractor and other trades, the environmental and surface conditions required for the execution of its work; and that each trade makes known the sequence of others' work required for installation of its work.

3.3 The General Contractor shall ensure that each trade, before commencing work, knows the requirements for subsequent work and that each trade is assisted in the execution of its preparatory work by trades whose work depends upon it.

3.4 The General Contractor shall ensure that shop and layout drawings, templates, and all information necessary for the location and installation of materials, openings, inserts, anchors, accessories, fastenings, connections and access panels are provided by each trade whose work requires cooperative location and installation by other trades and that such information is communicated to the applicable installer.

3.5 The General Contractor shall ensure that delivery of materials supplied by one trade to be installed by another, is well before the installation begins.

3.6 The General Contractor shall inform all trades that giving installation information in error, or too late to incorporate in the work, shall be responsible for any extra work caused thereby.

4 WORK SCHEDULE AND PHASING

4.1 Provide within 5 working days after Contract award a schedule showing anticipated progress stages and final completion.

4.2 The school shall continue to be in operation throughout the construction contract including reduced usage throughout the summer break. Work is to be undertaken to minimize disruption to the school operations. Construction schedule to be coordinated with school staff. Schedule to outline the phases of work and sequence of operations in all the affected areas of work.

4.3 Safe exiting must be maintained throughout the construction process. Contractor to prepare a Fire Safety Plan and review same with the Building and Fire Departments for continued fire safety egress during construction. The Contractor is responsible for safety during construction and is required to comply with all the requirements of Authorities Having Jurisdiction. The approved Fire Safety Plan is to be submitted to the Consultant and the Board for review and approval.

4.4 Specific areas to be blocked during various phases of construction are to be reviewed with School Board,designated school staff and Consultant for approval prior to submission to Authorities Having Jurisdiction.

4.5 Any areas to be blocked off with hoarding or enclosures for areas of work and / or designated storage of materials are to be co-ordinated with School Board, designated school staff and Consultant for approval. Enclosures must be provided for life safety and to minimize disruptions for noise, dust, etc. and to minimize impact on regular movement of people / flow of traffic.

4.6 Time is of the essence for completion of their work.

4.7 Scheduling conditions: construction hours are to be coordinated with the Board, school staff and the Consultant. Generally, daily from 7:00am to 5:00pm; noisy work during school operation, must be done after hours. Site access (construction traffic, deliveries, etc.) during school operating hours as confirmed with School Principal):

4.8 “Fire Access Route” to remain clear at all times. No parking or queuing of vehicles will be permitted. Contractor to arrange for parking for construction personnel, deliveries, etc. When the school is not occupied, Contractor may use the school parking lot for deliveries and personnel parking at their own risk. Any and all damage resulting from such use to the site and / or buildings must be remedied at the Contractor’s expense to the satisfaction of the Architect. Patching shall not be evident.

4.9 There shall be no disruption of mechanical and electrical systems during the course of school operation hours. Any requirements for system shut-downs, etc., must be scheduled for after school hours and weekends, scheduling of such disruptions to be coordinated with designated school staff.

4.10 Fire Alarm verification to be done after school hours or on weekends - to be coordinated with designated school staff.

4.11 Where work is carried on after school hours or on weekends, General Contractor shall comply with Board security procedures for openings.

4.12 All co-ordination specified with school staff shall only be undertaken with the person(s) DESIGNATED by the School Board and all coordination between the Board and / or School Staff and

the Contractor(s) personnel shall be confirmed with the Architect prior to enactment for overall project coordination.

4.13 The General Contractor and Sub-trades will not take instructions from regarding carrying out the Work, the scope of Work or the acceptance of any Work from anyone other than the Architect or their applicable Consultants as authorized by the Board. Any Work undertaken at the request of any school staff and or other persons that has not been approved by the Architect and designated Board Project Manager will not be authorized and will not be accepted as a Change Order item and may be subject to remedial work to reinstate original condition if required by the Board.

5 CONSTRUCTION STAGING

5.1 The school shall continue to be in operation throughout their construction contract. Work is to be undertaken to minimize disruption to the school operations. A full construction schedule to be coordinated with Board and designated school staff prior to start-up. Schedule to outline the phases of work and sequence of operations in all the affected areas of work.

5.2 All existing facilities must be maintained in full operational capacity and in safe condition (including free from noise, dust and physical obtrusions) through-out the school year and therefore the new work shall proceed as the first stage commencing immediately after award of Contract with service tie ins and noise producing work occurring outside of school operating hours (4:30 pm to 9:30 am) or weekends subject to applicable municipal bylaws. No additional charges shall apply.

6 RENOVATION TO AN EXISTING OCCUPIED BUILDING

6.1 Absolutely no contracting personnel are allowed in the school building during operating hours (outside of the designated work area).

6.2 All access to the operating school building will be made after hours or on weekends.

6.3 Connection of any services must be made after hours or on weekends and in such a way that it leaves no disturbance to materials or systems, nor any exposed construction conditions within the operating school area. No additional charges shall apply.

6.4 The General Contractor shall designate a Flag person to control traffic around the construction zones for 1 ½ hours in the morning, 1 ½ hours at lunch and 1 hour at the end of the day. The School Board will provide specifications later. Due to school traffic, there will be no construction site access (construction traffic, deliveries, etc.) during times confirmed with School Principal:

8:00 am to 9:30 am and 3:00 pm to 4:30 pm Monday to Friday.

6.5 The General Contractor shall maintain construction fencing at all times.

6.6 Catering trucks are not permitted on the school site whatsoever.

6.7 Contractor shall minimize nuisances to the school operation such as noise, dust, odours. Due to noxious fumes, roofing and asphalt paving shall be done after hours (hours 4:30 p.m to 9:30am., or during the weekends).

6.8 Temporary power and water from the school are to be arranged with the Board's project manager at the pre-construction meeting in accordance with Section 01500 Temporary Facilities.

6.9 The Contractor shall be responsible for protection of the Work (including the existing premises when accessed by the Contractor and /or sub-trades and all staging areas) from intrusion of the elements

and unauthorized persons resulting in damage including acts of vandalism, theft and breach of security and /or public safety. All damage to be made good immediately at no cost to the Board.

7 RELATIONS OF TRADES

7.1 The Contract Documents have been generally divided into trade sections for the purpose of ready reference only. This does not limit the Contractor's liability nor establish the ultimate limits of various work to be performed. The responsibility as to which sub-trade provides required articles or materials to be built-in or provided, or otherwise complete the required work, rests solely with the Contractor.

7.2 The Contractor is responsible for coordinating all trades. They are solely responsible for determining the lines of demarcation between each Contractor and / or trades. Neither the Consultant nor the Board, assume any responsibility for any such determination or for any dispute arising concerning it. No extras will be considered due to any such dispute concerning either labour or materials.

7.3 Specifications and drawings form an integral part of the Contract Documents. Any subject or item omitted from one, but which is mentioned or reasonably implied in the other, shall be considered as properly and sufficiently specified and will be part of the Work. Similarly any item indicated as required by one discipline (ie. arch., mech., elect., etc.) shall be considered as properly and sufficiently specified and will be part of the Work.

8 ORGANIZATION

8.1 Organize the Work of each section as required for satisfactory and expeditious completion of the Work. Take field dimensions required for the Work. Fabricate and install work to suit field dimensions and conditions.

8.2 If applicable, take into account existing work to ensure best arrangements of components in available space. Contact the Consultant prior to commencing Work in critical locations and interface with other Contractors' Work.

8.3 Provide all forms, templates, anchors, sleeves, inserts and accessories required to be installed in the Work. Set in place, or instruct the applicable subtrade as to their location. Pay costs of extra work, if required, as a result of a failure to comply with these requirements at the proper time.

8.4 Before starting their work and from time to time as the work progresses, each Subcontractor shall examine the work and materials installed by the other Subcontractors insofar as it effects their own work, and the General Contractor shall promptly notify the Consultant IN WRITING, if any condition exists that will prevent any Subcontractor from giving a satisfactory result in their own work.

8.5 Should any Subcontractor start their own work without such notification, it shall be construed as an acceptance all preceding work and as a waiver of all claims or questions as to its suitability for receiving their work.

9 ADDITIONAL DRAWINGS

9.1 Consultant may furnish additional drawings to assist proper execution of the Work. These drawings will be issued for clarification only. Such drawings, however, shall have the same meaning and intent as if they were included with plans referred to in the Contract Documents.

10 EXISTING SITE CONDITIONS

10.1 Contractor is responsible for reviewing all provided reports, such as soil testing, geotechnical, hazardous materials and other miscellaneous reports included at the time of Tender (as such part of the Contract Documents) to ascertain all impact on the proposed Work.

10.2 The Contractor shall assume the work site based on the existing conditions as shown on the drawings and visible on the job site at the time of the closing of the tender.

10.3 Contractor is responsible to document by record photographs of the existing condition of the each area of the work and the areas immediately adjacent to it (building and site) prior to starting demolition and construction. Copy of record photographs to be submitted to Architect and to Owner's Project Manager **PRIOR TO COMMENCEMENT OF ANY WORK**. Failure to submit existing condition photographs sufficiently identifying existing conditions / damages shall require the Contractor to accept responsibility for any and all damaged materials in and around the place of the Work and for the provisions required to make good all such damage.

11 MATERIALS AND WORKMANSHIP

11.1 All materials shall be new and the best of their respective kinds, where a specific grade or brand is not indicated. Pre-packaged materials shall be delivered and stored in unopened containers.

11.2 All work performed under their Contract shall be done by mechanics skilled in their respective trades. They shall make use of such templates, jigs or special tools as may be required for the operation involved.

11.3 The acceptance of any materials or workmanship shall not be a bar to their subsequent rejection, if found defective.

11.4 Adequate, dry storage facilities shall be provided and all stored materials shall be protected from damage and theft.

11.5 All Contractors will do Work in accordance with the best industry practice of the type of work specified, unless the Contract Documents stipulate more precise requirements, in which case, the more precise requirements shall govern.

11.6 Do Work in a neat, plumb & square manner. Ensure that various work components are properly installed, forming tight joints and appropriately aligned junctions, edges and surfaces, free of warps, twists, waves, or other such irregularities.

11.7 Wherever indicated on the drawings or specifications, or in the manufacturers' / suppliers' written instructions, arrange to have manufacturers' / installer's representatives inspect the Work which incorporates their materials, products or items.

11.8 Do not permit materials to come in contact with other materials such conditions may result in corrosion, staining, discolouration or deterioration of the completed Work. Provide compatible, durable separators where such contact is unavoidable.

11.9 The design of the Work is based on the full interaction of its component parts. No provisions have been made for conditions occurring during construction. Ensure that no part of the Work is subjected to a load which will endanger its safety or which might cause permanent deformation.

11.10 Conceal pipes, ducts, conduit, wiring and other such items requiring concealment preferably in, wall or ceiling construction of all finished areas. If in doubt as to method of concealment, or intent of the Contract Documents in their regard, request clarification from the Consultant before proceeding with the Work.

11.11 Lay out mechanical and electrical work well in advance of concrete placement and furring installation to allow for proper concealment. Test and inspect Work before applying pipe covering and before it is concealed.

11.12 Provide and maintain control lines and levels required for the Work. Lay out the Work in accordance with these lines and levels and dimensions indicated on the drawings.

11.13 Verify lines, levels and dimensions and report any errors or inconsistencies on the drawings to the Consultants.

11.14 Final responsibility of satisfactory completion of all the Work, however, lies with the General Contractor.

12 QUALITY CONTROL

12.1 The Consultants and authorized Board staff shall have access to all areas of the Work, including any off site construction facilities.

12.2 The General Contractor shall give timely notice requesting inspection if Work is designated for special tests, inspections, or approvals by the Consultants, or any other authorized Board staff, or testing and inspection company.

12.3 If the General Contract covers, or permits to be covered Work that has been designated as outlined above, they shall uncover such work, have the inspections and tests satisfactorily completed and make good such work at no additional cost to the Board.

12.4 ***The Consultants or the authorized Board may order any part of the Work to be examined, if such Work is suspected not to be according to the Contract Documents. If, upon examination, such work is found not to be in accordance with the Contract Documents, then the General Contractor shall correct such Work and pay for cost of examinations and correction. If such Work is found to be in full accordance with the Contract Documents, the Board shall pay for the cost of examination and making good.***

12.5 If defects are revealed during inspection and/or testing, the appointed agency may request additional inspection and/or testing to ascertain the full degree of defects. The General Contractor shall correct the defects and irregularities as reported by the inspection and/or testing agency, at no additional cost to the Board and the General Contractor shall pay all associated costs for retesting and re-inspection.

12.6 The General Contractor shall provide any tools, materials or equipment that may be required by the inspection and/or testing agencies in retesting the Work. (e.g. Video camera rental to re-inspect incorrectly installed sewer lines.)

12.7 The employment of inspection and/or testing agencies does not, in any way, affect the General Contractor’s responsibility to perform the Work in strict accordance with the Contract Documents.

12.8 The General Contractor shall remove all defective work, whether the result of poor workmanship by him or their sub-trades, use of defective or damaged products, whether or not incorporated into the Work and any Work that has been rejected by the Consultants or authorized Board Staff as failing to conform to the Contract Documents. Replacement and execution of the affected Work shall be done in full accordance with the Contract Documents, making good other trades’ work damaged by such removals or replacements at no additional charge to the Board.

12.9 If, in the opinion of the Consultant and/or the authorized Board Staff, it is not expeditious to correct the defective Work, or Work not performed in accordance with the Contract Documents, the Board, may, at its sole discretion, deduct from the Contract Price, the difference in value between the work performed and that required by the Contract Documents, the amounts of which shall be determined by the Board.

12.10 The notable exception to the above item is a faulty installation of base and asphalt paving. If, the inspection agency, after performing random test holes to determine compaction and thickness of sub base, base and asphalt, determines that either one or both, are not according to what was specified in the Contract Documents, the Board will not accept credits for such inconsistencies but rather, demand that any such installation be removed and redone in its entirety, at the pleasure and convenience of the Board, but within the first year of the warranty period.

13 BYLAWS, PERMITS AND APPROVALS

13.1 Nothing indicated on the Drawings or Specifications is intended to be in conflict with any law, by-law or regulation of Municipal, Provincial, or similar Authority Having Jurisdiction.

13.2 Work of the Contract must conform with such laws, by-laws and/or regulations.

13.3 Furnish inspection certificates and/or permits as may be applicable as evidence that the installed Work conforms to laws, by-laws and regulations of Authorities Having Jurisdiction.

13.4 Each sub-trade shall obtain and pay for all permits and licenses required by Municipal, Provincial, or other authorities Having Jurisdiction, particular to their trade.

13.5 It is the final responsibility of the General Contractor to obtain all the required approvals and permits and include in their Total Stipulated Price, the cost of such approvals, permits and fees. The only exception is the Building Permit, which will be applied for by the Consultant and paid for by the Board.

13.6 The Contractor shall obtain and submit per the requirements of Section 01300 all Inspection Certificate(s) provided / required by provincial, municipal and other authorities having jurisdiction.
Note: Substantial and Final Completion will not be reviewed / obtained without the following declarations:
The Contractor shall provide (and pay any fees required to produce) the Municipalities “Certificate of Clearance” (or similar wording) that states the municipality has performed their required building inspections per their requirements in conformance with the issued Building Permit and that no outstanding deficiencies are known to exist per the Municipalities requirements TO PERMIT OCCUPANCY, and

13.7 Any revisions or deviations from the Contract Documents required by any Authorities Having Jurisdiction must be submitted in writing and reviewed by the Consultants before implementation.

14 SAFETY DATA SHEETS

14.1 The General Contractor shall ensure that the following material and safety data sheets are submitted prior to commencing installation and application of at least the following:

Lead-free solder	sealants and caulking
resilient flooring	painting and finishing
fertilizers	glues and adhesives
pesticides	herbicides

any other product which may give off air borne particles after installation.

14.2 *The General Contractor and all of their Subcontractors must note that specifically, Asbestos and Asbestos containing materials, solder for piping containing lead, and Painting & Coatings containing lead and/or mercury must be excluded from any part of the Work*.

14.3 The General Contractor must submit Certificates of Compliance, prior to the application for Substantial Performance, for each of the following items:

a) An affidavit relative to the use of Lead-free solder for all domestic water lines, regardless of location.
b) Products for which Material Safety Data Sheets have been submitted and accepted.
c) Other Work/Products identified in the Contract Documents as requiring a Certificate of Compliance.

14.4 Each Certificate of Compliance must indicate names and addresses of the project, the Board, the date of Issue, produce description including name, number, manufacturer, with a statement verifying that the Work/Product installed meets specified requirements and, if applicable, complies with the submitted and accepted Material Safety Data Sheets.

14.5 Each Certificate of Compliance must be issued on the trade's letterhead, properly executed, under whose work the respective Work/Product has been provided.

14.6 Each Certificate of Compliance must be endorsed by the General Contractor with their authorized stamp/signature.

15 REGULATING DOCUMENTS

15.1 The General Contractor and all of their Subcontractors, Suppliers/Installers etc., must conform to the Ontario Building Code Canadian Electrical Code, The Occupational Health and Safety Act, Ontario, the National Fire Code, the local Municipal Fire Code, and all other applicable Codes and Building By-Laws. All must also conform to the requirements of the Authorities Having Jurisdiction, such as Public Utilities. Where required under the Occupational Health and Safety Act, engage a Professional Engineer to design formwork and falsework for concrete.

15.2 Contract forms, codes, standards and manuals referred to in these specifications are the latest published editions at the date of close of tenders. The General Contractor and all of their Subcontractors, Suppliers/Installers must meet or exceed the requirements of specified standards.

15.3 Provide, on site, copies of documents referred to in the Specification for joint use of Contractor and Consultant.

16 GENERAL CONTRACTOR'S RESPONSIBILITIES

16.1 *The list of General Contractor's responsibilities identified below is by no means comprehensive, nor is it in any priority or critical order. It is here, merely to identify the most often forgotten or ignored responsibilities of the General Contractor and is reproduced only as a reminder. The Consultants and the Board advise the General Contractor that it is* ***they*** *who are responsible for all aspects and facets of the Project, from start to completion, from compliance with Occupational Health and Safety regulations to compliance with all codes and statutes.*

16.2 The General Contractor will be responsible to take all necessary steps to protect personnel (workers, visitors, general public, etc.) and property from any harm during the course of the contract.

16.3 All equipment shall be in safe operating condition and appropriate to the task.

16.4 Only competent personnel will be permitted on site. The General Contractor will cause to remove from the site any persons not observing or complying with safety requirements.

16.5 The General Contractor shall comply with, and shall ensure that all of their Subcontractors, Suppliers, Installers etc., comply with all Federal, Provincial and Municipal Safety Codes and Regulations and the Occupational Health and Safety Act.

16.6 The General Contractor shall supply competent personnel to implement their safety program and ensure that all Subcontractors comply with the Board's standards, and those of the Occupational Health and Safety Act.

16.7 The Board will provide periodic monitoring to ensure that safety requirements are met, and that safety records are properly kept and maintained. Continued disregard for safety standards can cause the Contract to be canceled and the General Contractor removed from the site.

16.8 The Board may hire Commissioners to perform inspections of building systems at the closing stages of the work of their contract. The General Contractor shall cooperate with and coordinate the work of the Board's Commissioners on site.

16.9 The General Contractor will report to the Board and Jurisdictional Authorities any accident or incident involving personnel and/or property of the Contractor, Board, or Public, arising from the General Contractor's or any of their Subcontractors' execution of the work.

16.10 The General Contractor will include all provisions of their contract in any agreement with Subcontractors, and hold them equally responsible for safe work performance.

16.11 If the General Contractor is responsible for a delay in the progress of the work due to an infraction of legislation or Board Health and Safety requirements, the Contractor will, without additional cost to the Board, work such overtime, and acquire and use for the execution of the work such additional labour and equipment as to be necessary in the sole opinion of the Board's Representative and Consultant, to avoid delay in the final completion of the work or any operations thereof.

17 MANUFACTURERS' INSTRUCTIONS

17.1 Unless otherwise specified, the General Contractor and all their Subcontractors shall comply with manufacturer's latest printed instructions for materials and installation methods.

17.2 The General Contractor shall notify the Consultant in writing of any conflict between the Specifications and Manufacturer's Instructions and have same clarified.

18 AIR AND VAPOUR SEAL

18.1 The General Contractor shall ensure that exterior walls, windows, floor and roof surfaces provide an air-tight and vapour-tight membrane to prevent problems due to building vapour migration.

18.2 In general, the air/vapour barrier must be achieved on the interior side of the thermal insulation.

19 FIRE SAFETY

19.1 The appropriate clauses of the Ontario Building Code relating to fire protection shall be strictly followed.

19.2 The General Contractor shall provide and maintain free access to temporary or permanent fire hydrants acceptable to local fire department.

20 CONSTRUCTION SAFETY

20.1 The General Contractor and all their trades must observe and enforce construction safety measures required by Canadian Construction Safety Code, Workplace Safety & Insurance Board and Municipal statutes. In particular, the Ontario Construction Safety Act, the regulations of the Ontario Department of Labour and Ontario Hydro Safety Requirements shall be strictly enforced. In event of conflict between any provisions of above authorities the most stringent provisions will apply.

20.1 *The General Contractor is reminded, once again, that it is **the General Contractor** who is responsible for Occupational Health and Safety on their Project. The items listed below are only guidelines of the Board's expectations in their regard and not to be construed to be comprehensive or total in nature.*

20.2 The General Contractor shall inform and instruct Other Contractors that they, while performing work on their project, are under the authority of the Contractor. Other Contractors are to discuss and co-ordinate with, and follow instructions from, the General Contractor on all matters of site access, vehicles, deliveries, storage, temporary facilities, coordination with the work of other subcontractors, work methods, scheduling, labour conditions, construction safety, environmental protection, security and all other matters which relate to the safe and proper execution of construction work.

20.3 The General Contractor shall ensure that all supervisory personnel on job site are fully aware of the procedures and requirements outlined above and comply with all requirements specified.

20.4 All Contractors are responsible to ensure that all machinery and/or equipment are/is safe and that the workers perform their tasks in compliance with established safe work practices or procedures. Workers must receive adequate training in their specific work tasks to protect their health and safety.

20.5 The General Contractor shall be responsible for all persons and companies performing work, including Other Contractors, on this project, at all times, up to and including, the date of Substantial Performance of the Work. Authority for coordination and instructions relating to all matters which relate to the safe and proper execution of construction work shall rest with the General Contractor. The Contract Price must include the General Contractor's fees for the coordination and supervision of the work of all Other Contractors.

20.6 In addition to the responsibility of all contractors as outlined above, Subcontractors will be held accountable for the health and safety of workers under their supervision.

20.7 Every worker must protect their/her own health and safety by working in compliance with the law and with safe work practices and procedures established by the authorities having jurisdiction.

20.8 All sections of the Occupational Health and Safety Act, latest edition, and the Occupational Health and Safety Act for Construction projects, latest edition, shall be enforced, by the General Contractor, in their entirety, throughout the duration of the construction project.

20.9 The General Contractor shall provide the Consultant with the telephone number where the General Contractor or their representative can be reached at any time, day or night, for the duration of the contract.

20.10 Where an accident, explosion, or fire causes a person injury at the work place, and the worker is disabled from performing the usual task, the General Contractor shall prepare a written notice and shall forward same to the Ministry of Labour within four days of the occurrence with a copy to the Board's Representative, who shall copy and inform the Board's Supervisor of Health and Safety and/or the Board's Joint Health and Safety Committee, containing such information and particulars as may be described.

20.11 Where a person is killed or critically injured from any cause at the work place, the General Contractor shall immediately call the Ministry of Labour. A written notice from the General Contractor shall be given to the Ministry of Labour within forty-eight hours after the occurrence, containing such information and particulars as may be prescribed, with copies to the Architect and the Board's Representative.

20.12 The General Contractor is advised that the accident scene is under the jurisdiction of the Ministry of Labour and no wreckage, articles, etc., shall be interfered with, disturbed, destroyed, altered or carried away at the scene, or connected with the occurrence, until the Ministry of Labour has given permission.

21 INDEPENDENT TESTS AND INSPECTIONS

21.1 The Contractor shall appoint inspection firms as directed by the Consultant and make payments from the cash allowances specified in Division noted, except for the following, which shall be included in the contract:

21.2 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.

21.3 Inspection and testing performed exclusively for Contractor’s convenience.

21.4 Testing, adjustment and balancing of mechanical and electrical equipment and systems.

21.5 Mill tests and certificates of compliance.

21.6 Re-testing as already described in *Quality Control* of their Section.

21.7 The General Contractor shall furnish labour and facilities to:

21.8 Provide access to work to be inspected and tested.

21.9 Facilitate inspections and tests.

21.10 Make good work disturbed by inspection and test.

21.11 Pour concrete test cylinders and store as directed by Inspection Firm.

21.12 The General Contractor shall notify Inspection Firms sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

21.13 Where materials are specified to be tested, the General Contractor shall deliver representative samples in required quantity to testing laboratory.

22 LOCATION OF EQUIPMENT AND FIXTURES

22.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate fixtures.

22.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

22.3 Inform the Consultant of impending installation and obtain its approval for actual location.

22.4 Submit field drawings to indicate relative position of various services and equipment when required by the Board.

23 CONCEALMENT

23.1 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise and make good all damaged surfaces.

24 EXISTING FITMENTS

24.1 All fitments to be removed are the Contractor's property and to be removed from the site.

25 DESIGNATED SUBSTANCES

25.1 Hazardous Materials (refer to Hazardous Materials Report(s) Attached under separate cover).

.1 The Ontario Occupational Health and Safety Act requires the Board to provide a list of Designated Substances to all prospective contractors and they in turn must supply the list to their sub-trades who are likely to handle or disturb the material. On behalf of the Durham District School Board, the General Contractor will arrange for removal of readily identifiable hazardous materials that would impact on Construction as indicated in particular, Asbestos-containing building materials (designated substance) and PCB-containing electrical equipment (non-designated substance) during to the work of this project.

The Abatement contractor must be selected from the list of approved contractors indicated herein. The work of this section will be carried as per specifications provided by the Board's Abatement consultant and inspected by the same Consultant.

26 SITE INSTRUCTIONS

26.1 The contractor and their sub-contractors must follow the instructions of the designated Consultants and their inspectors as authorized by the Board. The Contractor shall not follow any instructions from any school staff for extra work – all such requests must be directed to the Architect for review by the Board. Any and all work completed or promised to the school staff by any Contractor will not be paid for. The General Contractor and Sub-trades will not take instructions from regarding carrying out the Work, the scope of Work or the acceptance of any Work from anyone other than the Architect or their applicable Consultants as authorized by the Board. Any Work undertaken at the request of any school staff and or other persons that has not been approved by the Architect and designated Board Project Manager will not be authorized and will not be accepted as a Change Order item and may be subject to remedial work to reinstate original condition if required by the Board.

27 CARETAKERS SERVICES

27.1 The caretaker will provide the services for moving equipment, i.e. furniture, desks, chairs, filing cabinets and equipment. The caretaker will move this equipment one time only, once out and once in at each area designated for Work by the Contract Documents.

27.2 The Contractor must schedule these services with the chief caretaker.

27.3 The caretakers will unlock any doors as required for the Work.

28 SITE MEETINGS

28.1 General Contractor to chair site meetings, record and distribute meeting minutes within 36 hours after each meeting.

28.2 Meetings to be scheduled bi-weekly.

29 HEALTH AND SAFETY

29.1 The Contractor shall comply with the current Occupational Health and Safety Act.

29.2 Hoisting is prohibited over occupied portions of the building.

30 SCAFFOLDING

30.1 All necessary scaffolding shall be provided and constructed according to all by-laws and safety regulations. It shall be removed promptly and completely when no longer required

31 PROTECTION OF OTHER WORK

31.1 Each trade shall avoid damage to other trades and shall take all measures necessary and provide all masking and materials necessary, to provide adequate protection.

31.2 Each Subcontractor shall be held responsible for all damage to work installed by others that is caused by ttheir work or by anyone employed by him.

31.3 Patching and repairing of damaged work shall be done by the Contractor who installed the work, as directed by the Consultant, but the cost of same, shall be paid for by the Contractor who is responsible for the damage.

32 FASTENINGS

32.1 All fastenings must be permanent, of same metal, or compatible with any metals with which they are in contact, of adequate size and spacing, to ensure permanent anchorage against load or shear.

32.2 Exposed fastenings must be evenly spaced, neatly laid out and must not mar surfaces of prefinished materials.

32.3 No ram setting or similar techniques will be permitted, without prior written approval of the Consultant.

33 SUPPLY AND INSTALL

33.1 Unless specifically noted, "*supply only*", any reference to supply intends the **supply and installation** of material or item so noted.

34 CHANGE ORDER PROCEDURE

34.1 Any variation in the Contract involving a change in the total amount of the Contract Price shall be initiated by the Consultant in the form of a Notice of Contemplated Change (NOCC) describing the work proposed under the variation and requesting a quotation from the Contractor.

34.2 The Contractor shall inform all Subcontractors and suppliers of the contemplated change.

34.3 The Contractor shall submit the NOCC with their quotation for the work.

34.4 The Contractor's quotation shall cover all work described in the NOCC and all other work caused, however incidental, by the contemplated change. Once the quotation is accepted by the Consultant, no further extra costs or time will be accepted in relation to the contemplated change.

34.5 Quotations for any changes to the work must be accompanied by a complete itemized breakdown of all costs and subcontractor's quotations so that the total price can be readily checked and verified.

34.6 If the quotation received is unacceptable as regards price or time, the Consultant will reject same and request a revised quotation from the Contractor.

34.7 When the Consultant deems the Contractor's quotation is acceptable; the Consultant will provide recommendation of acceptance to the Board for approval. The Consultant shall then prepare a Change Order (C.O.) for the change including the acceptable variations from the Contract Price and Time.

34.8 The C.O. will be forwarded to the Contractor for signature, they shall be returned to the Consultant, who shall then forward them to the Owner for signature.

34.9 The Contractor shall be responsible for providing all relevant Subcontractors with the required copies of a C.O.

34.10 Upon receipt of an NOCC by the Contractor, all work affected by the contemplated change shall be suspended until a C.O. signed by the Owner is received, or until notification is received from the Consultant canceling the NOCC.

34.11 Where progress of the work demands, the Consultant, with the approval of the Owner, may give written instructions to the Contractor to proceed with the contemplated change before issuance of a C.O. or resolution of any dispute over change to the Contract Price or Time.

34.12 The General Contractor and Sub-trades will not take instructions from regarding carrying out the Work, the scope of Work or the acceptance of any Work from anyone other than the Architect or their applicable Consultants as authorized by the Board. Any Work undertaken at the request of any school staff and or other persons that has not been approved by the Architect and designated Board Project Manager will not be authorized and will not be accepted as a Change Order item and may be subject to remedial work to reinstate original condition if required by the Board.

35 PAYMENT CERTIFICATES

35.1 Contractor to submit progress draws to the Architect for review.

35.2 The Architect will issue a Certificate of Payment to the Board, based on the approved progress draw.

35.3 Progress draws to be submitted once monthly.

35.4 Payment will not be authorized for material not secured / installed to the building.

35.5 The Contractor is required to submit a notarized statutory declaration and a copy of Workers' Compensation Board clearance certificate with each application for payment after the first application.

36 SUBMITTALS

36.1 Submissions are further specified under Sections 01300. Provide shop drawings, samples, product sheets etc. as called for throughout the specifications and in accordance with the approved schedule to ensure the work proceeds efficiently.

36.2 Provide as-built drawings for architectural, mechanical and electrical. Upon completion of work and prior to final inspection, the contractor shall obtain and pay for a computer USB Flash Drive(s) from the Consultant, containing all contract drawings and specifications, and shall alter such documents to reflect as-built conditions including all changes and deviations made during the work, as recorded on the record drawings. USB Flash Drive(s) shall be in AutoCAD 2016.

36.3 Final completion of Project Record Drawings shall be a condition precedent to the issuance of Consultants' final payment certificate.

36.4 Provide maintenance manuals for mechanical and electrical and as specified herein.

36.4 Hand over extra stock to caretaker (refer to individual sections). Obtain a signed receipt for materials handed over and include copy in Maintenance Manuals.

37 CONTRACT CLOSE-OUT

37.1 Close-out as per OAA/OGCA Take Over Procedure Document No. 100, latest edition.

38 DEMOLITION, RECONSTRUCTION, ALTERATIONS AND MAKING GOOD

38.1 Where the new Renovations and alterations interface with existing and where existing Work is altered execute all necessary cutting and fitting required to make satisfactory connections with

existing Work under this Contract. Leave the entire Work in a finished workmanlike condition acceptable to Consultant.

38.2 Make good all exterior finish system masonry, waterproofing, and other materials and finishes which are damaged or disturbed during execution of Work. Warranties specified for materials and workmanship shall apply.

38.3 Disconnect and relocate, where necessary, existing services and reconnect as required to complete the Work. Their work shall include, without being limited, to plumbing, drainage, electrical and gas required for accommodation of new work. Abandon all services not required in conformance with ordinances and laws.

38.4 Co-ordinate work of the various trades, taking into account existing installations to assure best arrangements of pipes, conduit, ducts mechanical, electrical and other equipment, in the available space.

38.5 If required, in critical locations prepare interference or installation drawings, or both, showing the work of various trades as well as existing installations. Submit to Consultant for written permission before commencement of work.

38.6 Drilling and cutting of existing work shall be carefully done, leaving a clean hole no larger than required. All patching shall be done to Consultant's approval.

38.7 Make good all areas disturbed to adjoining buildings due to the Work of their Contract.

38.9 Effectively seal off work area from the rest of the building to permit the continuation of Owner's operations during new construction.

38.10 Provide dust and weather tight temporary enclosures complete with hinged doors, fastenings and locksets to provide egress from existing building to new additions.

38.11 Dust-tight enclosures shall be of adequate construction, sufficient to obviate dispersion of dust and dirt into existing building.

39 MAKING GOOD FINISHES AND JOINING OF EXISTING AND NEW WORK

39.1 Floors of altered areas must be finished flush and prepared for final finish applications with adjacent existing finishes to remain.

39.2 Where floor slab is required to be cored / drilled for new services, care must be taken to install new openings clear of structural members and existing services to remain. After installation of new services, all openings must be made watertight and all required fire separations shall be maintained.

39.3 Where existing floor to be cut for new services, remove existing vinyl floor tile and supply and install new vinyl tile as per finish schedule / existing condition. Patching shall not be evident.

39.4 At existing openings in exposed concrete block walls shown to be blocked up, masonry shall be keyed in so that coursing and bond are continuous. Blocks to match adjacent. Salvaged blocks free of defects and / or mortar may be used to infill existing openings only at the approval of the Architect. Similarly for existing brick walls requiring patching. Do not use any salvaged materials in the construction of the new openings.

39.5 Where new openings are shown to be cut into existing walls, Contractor shall break open the wall to size required, provide new steel angle or lintel block over the opening (as specified) and patch all adjacent materials.

39.6 Where openings are blocked up in painted, where new openings are made, or where millwork or equipment are removed from walls; surface shall be completely repainted. All other walls in the same room as patched wall shall be painted with one finish coat of paint. No patch painting will be permitted.

39.7 All new horizontal runs of ducts, pipes and conduits shall be concealed in ceiling spaces, unless specifically noted otherwise.

39.8 All new duct drops and risers shall be concealed in ceiling spaces, bulkheads or furr out duct shafts. All new pipe and conduit drops and risers shall be furred out or buried in walls as indicated. New devices on walls shall be recessed and new devices on existing walls shall be surface mounted. Exposed conduit and wiremould shall be painted in with existing wall colour unless specifically noted otherwise on the drawings / shop drawings.

39.9 All existing ceiling components and ceiling mounted equipment shall be carefully removed where required.

39.10 Existing ceiling tiles which are removed shall be turned over to Board staff for re-use depending on condition. New ceiling tiles shall be installed to replace existing where removed due to construction.

39.11 Existing concrete and painted concrete floors shall be prepared according to manufacturers' instructions for new adhesive applied finishes or new paint finish per Room Finish Schedule.

39.12 Special care must be taken not to damage existing roof. Any damage must be repaired as recommended and approved by the Consultant.

39.13 Cutting, patching and flashing of the roof must be done in conformity with existing construction and adjacent surfaces. Integrity of the existing and new roofs must not be compromised.

39.14 Cuts through the existing steel deck must be reinforced. Provide stamped engineered shop drawings, showing locations and sizes of cuts and all reinforcement.

39.15 Provide roof curbs at roof mounted mechanical equipment and install roofing, flashing and counter-flashing to ensure weather tight seal.

40 COMPLETION

40.1 Upon completion of the Work, all protection erected shall be removed, all damage to the Work and adjoining Work due to the lack or failure of such protection shall be made good and all debris, surplus materials tools equipment shall be removed from the work areas and the site, and the Project shall be left clean and tidy to the full and complete satisfaction of the Consultant and Board Staff. The General Contractor shall give written notice to the Consultant, requesting final inspection of the completed Project.

40.2 Refer to the pertinent sections of the Specifications for requirements with respect to submission of *Record Documents, Maintenance Materials, Special Tools* and *Spare Parts.*

41 PERIODIC CLEANING

41.1 As part of the Tender, the General Contractor shall provide all necessary garbage bins through the duration of the project. The General Contractor shall ensure that the following is accomplished:

41.2 Keep all areas of the Work clean and orderly, free from accumulation of dirt, debris, garbage, oily rags, excess material, or such other trash items. Remove such items for all areas of the Work on a daily basis.

41.3 Vacuum and/or broom interior building areas when ready to receive painting and other finishes. Continue cleaning on an "as needed" basis until the building is ready for inspection and takeover.

41.2 Schedule cleaning operations so that resulting dust and other contaminants do not affect wet, newly painted surfaces.

41.3 In preparation for Substantial Performance, or Fit for Occupancy, whichever occurs first, conduct inspections of all exposed interior and exterior surfaces.

41.4 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from all exposed interior and exterior finishes, including glass and other polished surfaces.

41.5 Remove all protective film from switch plates and hardware, particular kick plates.

41.6 Clean lighting reflectors, lenses and other lighting surfaces.

41.7 Broom clean paved surfaces and rake clean other disturbed surfaces in the area of the Work, to remove site debris caused by the Work of their Contract. Inspect for damages and make good.

41.8 Remove debris and surplus materials from the roof areas and accessible concealed spaces.

41.9 Replace heating, ventilation and/or air conditioning filters whether or not, the units were operated during construction operations.

41.10 Refer to "clean-up" sections of the specifications for additional specific periodic and final clean up requirements.

41.11 *The General Contractor must note the Board insists that tiled (VCT) and sheet good floors (vinyl or linoleum) be broom swept only. Wet mopping and waxing/polishing will be done by the Board's Caretaking Staff.*

41.12 *Do not provide sealants and waxes on terrazzo, ceramic and other hard surfaced floors without reviewing products and methods of application with the Board's Caretaking Staff. Failure to comply with ttheir requirement will result in the contractor stripping these floors in their entirety.*

42 TEMPORARY PROTECTION

42.1 The General Contractor must provide temporary barricades, screens or barriers as directed by the Consultant and/or authorized Board Representative, for the safety of persons, or for dividing the Work from portion or portions of the building or site that may be required for use by the school, or others.

42.2 Properly protect the Work from any damage by the elements. In cold weather cover all exterior openings in the work areas likely to cause water damage.

42.3 During off hours and/or stages of suspended operations for whatever reasons, the General Contractor must assume all responsibility for protection against the elements, theft and/or vandalism. This applies not only to the work in progress, but also to any materials, products, tools, equipment, or other such items left at the work site.

42.4 Properly protect floors and roofs from any damage. Take special precautions when moving heavy loads or equipment over floors and roofs.

42.5 The General Contractor must keep floors free of oils, grease or other such materials likely to discolour them and/or affect bonding of applied surfaces.

42.6 The General Contractor must ensure that no part of the Work is loaded greater than it was designed for, when completed. Make any temporary support as strong as the permanent support. Place no load on concrete structure until it has sufficient strength to safely bear such load.

42.7 Protect glass and other finishes against heat, slab and weld splatters, using appropriate protective shields and covers.

42.8 The General Contractor must provide and maintain, in good working order, appropriately labeled ULC fire extinguishers, to the approval of Authorities Having Jurisdiction.

42.9 The General Contractor must provide a minimum of two safety helmets on site at all times for the use of the Consultant and any other Board authorized visitors to the site. It is the General Contractor's responsibility to make certain that any such visitors wear the protective headgear and any other safety gear which may be necessary at that particular time of construction.

Documents

1.1 General

.1 Conform to the General Conditions of Standard Construction Document CCDC 2, 2020 Stipulated price Contract produced by the Canadian Construction Association (CCA) as amended by the Supplementary Contract Conditions and Supplementary General Articles.

1.2 Co-ordination of the Contract Documents

.1 The Contract Documents are meant as statements to describe the complete scope of the work. In the case of discrepancy, conflict or error the Contract Document shall give precedence in the following descending order:

.1 Agreement
.2 Addenda
.3 Supplementary General Conditions
.4 General Conditions
.5 Specifications
.6 Drawings

1.3 Interpretation of Contract Documents

.1 Wherever the words “approved”, “permitted”, “required”, “inspected”, “instructed”, “accepted”, “submitted”, “ordered”, “satisfactory” or similar words are used in the Contract Documents, it shall be understood, unless the context provides otherwise, that the words “by (or to) the Agent” follow.

.2 Where a device or part of equipment is referred to in the singular number, it is intended that this reference applies to as many such devices as are required to complete the installation.

1.1 **RELATED INSTRUCTIONS**

1.1.1 Comply with requirements of Cash Allowance of the General Conditions.

1.2 **AUTHORIZATION**

1.2.1 Expenditures from allowances included in the Contract Price must be authorized in writing by the Board.

1.2.2 Work covered by allowances shall be performed for such amounts and by such persons as directed by the Owner through the Consultant.

1.3 **CASH ALLOWANCES**

1.3.1 Allowances, unless otherwise specified, cover the net cost to the contractor of services, products, construction machinery and equipment, freight, handling, unloading, storage, installation and other authorized expenses incurred in performing the Work.

1.3.2 The Contract Price, not the cash allowance, includes the Contractor's overhead and profit associated with each allowance.

1.3.3 The Contract Price will be adjusted by written order to provide for an excess or deficit to each cash allowance. Where the costs under the sum of all cash allowances exceed the amount of the sum of the cash allowances, the Contractor will be compensated for any extra incurred plus Overhead and Profit as set out in the Supplementary General Conditions. Unused portions of the Cash Allowances plus the associated Overhead and Profit from the Contract Price shall be treated as a credit.

1.3.4 Progress payments on accounts of work authorized under cash allowances shall be included in the Consultant's monthly certificate for payment.

1.3.5 A schedule shall be prepared by the Contractor and reviewed with the Consultant, to show when items called for under cash allowances must be authorized by the Consultant for ordering purposes so that the progress of the Work will not be delayed.

1.4 **ALLOWANCES:** Include the following allowances in the Contract:

1.4.1 **RS Mclaughlin CVI**

a) Cash Allowances to include:
   1) Client requested Independent Inspections & testing allowance
   2) Unforeseen site conditions - hazardous materials abatement (beyond scope of work identified in base bid contract documents)
      Hazardous materials testing for Type 3 removal (including inspection prior to abatement, post abatement, clearance air sampling).
   3) Cash Allowance for Controls and PA
   4) Plus, other allowances specified throughout the specification.

Total Cash Allowances: **$25,000.00** *not including HST*

Field Engineering

1.1 Setting Out the Work

.1 The Contractor shall be responsible for the construction layout.

.2 Verify all elevations, lines, levels, and dimensions and report any errors, discrepancies or conflicts to the Consultant.

.3 Establish and maintain benchmarks, location stakes and batter boards as required.

.4 Verify and record proposed location and finished elevations relative to existing grades.

.5 Determine actual location and elevation of existing underground utilities where connections are required.

.6 Call in relevant utility companies where required to locate utilities.

.7 Undertake test digging where required.

.8 Verify and coordinate finished elevations and dimensions of the work of one Section with respect to a related Section of the Work.

.9 Prepare interference drawings of system and equipment components to ensure that all elements can be accommodated within the spaces provided.

.10 Ensure that all clearances required by authorities having jurisdiction are maintained in the installed work.

END OF SECTION

Regulatory Requirements

1.1 Permits, Licenses and Fees

.1 The Contractor shall obtain and pay for, in a timely manner in order to avoid delays to the construction, all permits, licenses and inspection fees required by authorities having jurisdiction for specific trade functions.

.2 The Owner has applied for ***the Building Permit*** for this project. The application is currently under review by the Municipality

.3 The Owner shall obtain and pay for, in a timely manner in order to avoid delays to the construction, the Building Permit and Occupancy Permit.

1.2 Building Code By-Laws and Regulations

.1 Carry out all work in accordance with the regulations of the Ontario Building Code, latest issue, including all amendments and revisions.

.2 Comply with all requirements, regulations and ordinances of all jurisdictional authorities.

.3 Comply with and pay for requirements of local authorities regarding any necessary work outside the property lines such as curbs and sidewalks.

.4 Inform the Consultant of any known variance of the Contract Documents from the requirements of the Building Code and authorities having jurisdiction and assume responsibility for work known to be contrary to such requirements and performed without notifying the Consultant.

1.3 Fire Protection

.1 Materials and components required to construct fire rated assemblies and materials requiring fire hazard classification shall be listed and labelled.

.2 Fire rated assemblies shall be constructed in accordance with applicable fire test report information issued by the fire rating authority. Deviation from fire test report will not be allowed.

.3 Construct fire rated assemblies as continuous, uninterrupted elements except for permitted openings. Extend fire rated walls and partitions from top of floor assembly to underside of the fire rated assembly above.

1.4 Hazardous Materials

.1 Comply with requirements of the Occupational Health and Safety Act, as amended to include WHMIS (Workplace Hazardous Materials Information System).

.2 Ensure that a current Material Safety Data Sheets (MSDS) arrives before or with the first delivery of every controlled product.

.3 Check the date to ensure that the MSDS is up-to-date (MSDS are valid for three years from date of production).

.4 Ensure that worksite copies of the MSDS are available to workers wishing to consult them and to the health and safety representative and/or joint health and safety committee.

.5 Ensure that workers are instructed in the purpose and content of MSDS.

Site Administration

1.1 Pre-Construction Meeting

.1 Immediately prior to construction, upon notification attend at location of Owner's choice, a pre-construction meeting, along with authoritative representatives of key subcontractors, project superintendent, inspection and testing company representatives, and the consultants.

.2 Purpose of meeting is as follows:

.1 Review project communications procedures.

.2 Review Contract administration requirements including submittals, payment and change order procedures.

.3 Identify all critical points on Construction Schedule for positive action.

.4 Review Consultant's inspection requirements.

.5 Review any points, which require clarification.

1.2 Site Meetings

.1 Hold regular site meetings every two weeks. Ensure that persons, whose presence is required, are present and that relative information is available to allow meetings to be conducted efficiently. The Consultant will attend these meetings. The Owner may also choose to attend these meetings, at his discretion.
.2 Schedule additional meetings, if required.
.3 Prepare an agenda for each meeting and distribute a copy to all required participants prior to the meeting.
.4 Record minutes of each meeting and promptly distribute copies to be received by all participants not later than seven days after meeting has been held.

1.3 Supervision

.1 Employ an experienced and qualified superintendent for the project who shall devote his time exclusively to the work of this Contract and who shall be in complete charge of the work from commencement to completion. A working foreman will not be acceptable. The superintendent shall not be changed after commencement of work without the Consultant's approval. The Superintendent shall possess a C.C.S. and/or Gold Seal Certificate designation and be acceptable to the Owner.

.2 Supervise, direct, manage and control the work of all forces carrying out the work, including subcontractors and suppliers. Carry out daily inspections to ensure compliance with the working drawings and detailed specifications and the maintenance of quality standards. Ensure that the inspection staff includes personnel competent in supervising the mechanical and electrical trades.

1.4 Progress Record

.1 The Contractor shall maintain on site, permanent written record of progress of work. Record shall be open to inspection by Owner at all times and copy shall be furnished to Consultants upon the Consultant's request.

.2 This record shall show weather conditions, dates of commencement, progress and completion of various trades and items of work. Particulars pertaining to erection and removal of forms, pouring of concrete, installation of roofing and other critical or major components as well as number of employees of various trades and type and quantity of equipment employed daily, shall be noted.

.3 Display a copy of the construction schedule in the site office from start of construction to completion. Superimpose actual progress of work on schedule at least once each week.

1.5 As-Built Drawings

.1 Maintain an accurate set of As-Built Drawings showing progress of the work and all changes, revisions and additions to the work and deviations from the Contract Documents in red ink.

.2 Include accurate location, depth, position, size and type of concealed and underground services, both inside and outside shall be as part of these As-Built Drawings.

.3 As-Built Drawings shall be available for review at each site meeting by the Consultant.

1.6 Documents on Site

.1 The Contractor's field office shall at all times contain a complete set of Contract Documents with all addenda, site instructions, change orders, reviewed shop drawings and samples, colour schedule, paint materials schedules, hardware list, progress reports and meeting minutes.

.2 The Contractor's field office shall at all times contain a complete set of all construction documents, as issued for building permit and bearing the stamp of the appropriate municipal authority.

Submittals

1.1 General

.1 Unless specified otherwise, make all submissions to the Consultant at his office, with additional submissions made as directed by the Consultant to other parties involved in the construction.

.2 Make all submissions required by the Contract Documents with reasonable promptness and in orderly sequence so as to cause no delay in the work.

1.2 Project Schedule

.1 The Contractor shall submit a detailed Project Schedule in Gantt Format to the Owner for review. The Contractor shall make all changes to the schedule requested by the Owner.

.2 Provide schedule updates on a monthly basis for duration of Contract.

1.3 Cash Flow Chart and Contract Breakdown

.1 The Contractor shall submit an estimated cash flow chart broken down on a monthly basis. Cash flow chart shall indicate anticipated Contractor's estimated monthly progress billings from commencement of work until completion.

.2 The Contractor shall update cash flow chart whenever changes occur to scheduling.

1.4 Mock-ups

.1 Where required by the Performance Specifications, construct mock ups of the work in a location approved by the Consultant.

.2 Construct mock-ups from the specified materials and assemblies for the review of the Consultant.

.3 Make any revisions required by the Consultant.

.4 Mock-ups reviewed and approved by the Consultant shall become the standard against which installed work will be evaluated.

.5 Mock-ups, on the approval of the Consultant, may be incorporated into the finished work.

.6 Do not proceed with the Work until the associated mock-up has been approved.

1.5 Samples

.1 Submit 2 sample boards of all finishes to be used. The Owner and Consultant will review samples.

.2 Submit samples with identifying labels bearing material or component description,

manufacturer's name and brand name, project name, location in which material or component is to be used, and date.

.3 No work requiring a sample submission shall be commenced until the submission has received Consultant's final review.

.4 Within the project schedule, allow ten (10) working days for the review and approval of samples by the Owner and the Consultant.

1.6 Maintenance and Operating Manuals

.1 Submit in accordance with ***Section 01770 Project Close Out***.

1.7 Replacement Material

.1 Supply replacement material at completion of the project for the following products:
Floor Tiles - Provide 5% or nearest larger case lot of total quantity of each colour and pattern of flooring material and base required for this project for maintenance use. Store where directed.
Rubber Floor - Provide 5% or nearest larger case lot of total quantity of each colour and pattern of flooring material and base required for this project for maintenance use. Store where directed.
Paint - one full litre can of each colour
Ceiling tile - 50 tiles of each type

.2 Turn over all material to the Owner and obtain a signed receipt for same.

1.8 Schedule of Submittals

.1 Submit detailed schedule of submittals for shop drawings, samples, list of materials for review by the Consultant.

.2 Indicate the date of submission and time limit for review of each item.

.3 Schedule submissions to allow adequate time for review and resubmission if necessary.

1.9 Shop Drawings

.1 Submit shop drawings based on metric measurements: 3 prints for architectural shop drawings and 4 prints each for structural, electrical and mechanical shop drawings.

.2 No work requiring shop drawing submission shall commence until final review has been obtained from the Consultant.

.3 Review of shop drawings by the Owner and Consultant does not relieve the Contractor of this responsibility for detail design inherent in the shop drawing. The Contractor is responsible for all dimensions and coordination pertinent to the fabrication and/or construction and installation techniques and coordination of work of all sub-trades.

Quality Control

1.1 General

.1 The Contractor shall retain and the Owner shall pay independent inspection companies who shall inspect and test site conditions, procedures and materials related but not limited to the following:

AS INDICATED IN SECTION 01020 CASH ALLWANCES

1.2 Duties and Authorities of Testing Agency

.1 The Consultant shall prepare terms of reference for each testing agency. These terms of reference shall be submitted to the Contractor for review.

.2 Testing agency is expected to do the following:

.1 Review the relevant specification section with respect to materials and standards required prior to conducting any inspections.

.2 Act on a professional and unprejudiced basis and carry out inspection and testing functions to establish compliance with requirements of Contract Documents, Working Drawings and Detailed Specifications. Notify the Consultant immediately of any deviation from the Contract Documents.

.3 Check work as it progresses and prepare reports stating results of tests and conditions of work and state in each report whether specimens tested conform to requirements of Contract Documents, Working Drawings and Detailed Specifications, specifically noting deviations.

.4 Distribute reports as follows:

.1 Owner - 1 copy
.2 Consultant - 2 copies
.3 Building Department - 1 copy
.4 Contractor - 1 copy
.5 Sub-consultants (where applicable) - 1 copy

.3 Testing agency is not authorized to amend or release any requirements of Contract Documents, Working Drawings nor Detailed Specifications, nor to approve or accept any portion of work.

1.3 Contractor's Responsibilities

.1 The Contractor shall do the following:

.1 Notify testing agency minimum 48 hours in advance of operations to allow for assignment of personnel and scheduling of tests without causing delay in work.

.2 Provide testing agency with access to work at all times.

.3 Supply material samples for testing.

.4 Supply casual labour and other incidental services required by testing agency.

.5 Provide facilities for site storage of samples.

.2 When initial inspection and testing indicates non-compliance with Contract Documents, Working Drawings or Detailed Specifications any subsequent re-inspection and re-testing occasioned by non-compliance shall be performed by same testing agency and cost thereof borne by the subcontractor.

Temporary Facilities

1.1 General

.1 Provide all temporary facilities and controls required for the proper execution of the work.

.2 Provide and maintain temporary systems in accordance with applicable regulations and requirements, and arrange to obtain and pay for any permits required. Cost to be paid by the Owner.

1.2 Temporary Electricity and Lighting

.1 Provide and pay for temporary electrical lighting and power systems required for the work of this Contract.

.2 Install and maintain temporary electrical systems in accordance with the Construction Safety Association's "Temporary Wiring standards on Construction Sites" the Ontario Electrical Code and other authorities having jurisdiction.

1.3 Temporary Heating

.1 Furnish equipment, labour and fuel to provide temporary heat as required for proper execution of the work of this Contract.

1.4 Temporary Ventilation

.1 Provide minimum 1 (one) air change per hour for enclosed areas receiving architectural finishes.

.2 Do not allow excessive build-up of moisture inside building.

1.5 Temporary Telephone/Facsimile Machine

.1 Provide site telephone and separate facsimile service for duration of Contract until completion.

1.6 Temporary Water

.1 Provide temporary potable water supply; required for the work of this Contract.

1.7 Temporary Sanitary Facilities

.1 Provide and maintain sanitary toilet facilities for the use of all personnel on site.

1.8 Temporary First-Aid Facilities

.1 Provide site equipment and medical facilities necessary to supply first-aid service to injured personnel in accordance with regulations of the Workers' Compensation Act. Maintain facilities for duration of Contract.

1.9 Temporary Fire Protection

.1 Provide and maintain on site, for the duration of the Contract, adequate fire protection in accordance with all regulatory and jurisdictional requirements.

1.10 Temporary Use of New Permanent Service and Equipment

.1 Do not use any new permanent service or equipment without written approval of the Consultant.

.2 Pay for any operating costs.

.3 Perform any required repairs and maintenance and turn over equipment to Owner in new and perfect operating condition.

.4 Use of permanent systems and equipment shall not affect the warranty conditions and warranty period for any such systems and equipment. Make allowances to ensure that the Owner receives the full equipment manufacturer's warranty from the date of project takeover.

1.11 Construction Aids

.1 Provide and maintain temporary stairs, ladders, ramps, hoisting equipment, scaffolding and false work.

1.12 Barriers

.1 Provide and maintain required hoardings, barricades, guardrails, and light guards in accordance with applicable regulations.

1.13 Temporary Controls

.1 Provide protective coverings to protect work against damage caused by weather, including but not necessarily limited to rain, snow, ice, wind, frost and excessive heat.

.2 Provide wind breaks and sun shades to allow proper setting and curing of cementitious materials.

.3 Protect building materials from freezing.

.4 Prevent sprayed materials from contaminating air beyond application area, by providing temporary enclosures.

.5 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.

1.14 Temporary Drainage and De-watering

.1 Provide and maintain temporary site drainage and de-watering necessary to carry out the work of this Contract.

.2 Conform to erosion and sedimentation control requirements of the authorities having jurisdiction.

1.15 Disposal

.1 Remove all surplus excavated material from the project site.

.2 Remove all construction refuse off-site.

.3 Provide all necessary haulage and related costs for disposal.

1.16 Temporary Field Office

.1 The Contractor shall provide and maintain a temporary office to accommodate administrative activities and site meetings, complete with light, heating and cooling equipment, ventilation, telephone, fax machine, table and chairs.

Products and Workmanship

1.1 Product Quality

.1 Products supplied for work shall be new and as far as possible and unless otherwise specified, of Canadian manufacture.

1.2 Standards

.1 The work of each trade shall be carried out by skilled, experienced personnel who have been certified to carry out the work by various trade associations and in accordance with the Apprenticeship and Trades Qualifications Act and applicable regulations.

.2 Where reference is made to specification standards produced by various organizations, conform to the latest edition of the standards specified as amended and revised to the date of the Contract.

.3 Each subcontractor must possess and be familiar with the specified standards, which affect their work.

.4 Generally, materials and workmanship shall meet or exceed the requirements of CAN/CSA, ASTM, CGSB, CAN/UL and manufacturer's printed instructions.

.5 Where required, conform to the requirements of LEED® Certification.

1.3 Substitutions

.1 The Contractor shall base his Tender Price upon the Tender Documents.

.2 Prior to the Close of Tenders, the Owner and the Consultant may consider requests for substitutions from that specified in the Tender Documents, providing the requests are submitted in writing describing such substitutions in full detail, the type of material, equipment or method and reasons for deviating from the Tender Documents. In addition, submit any increase or decrease in price of any substitution.

.3 In making a request for a substitution, confirm in writing that:

.1 The Contractor has investigated the proposed product and method and determined it to be equal or superior in all respects to that specified.

.2 The same guarantee is given for the proposed substitution as for the product and method originally specified.

.3 The installation of the proposed substitution will be co-ordinated into the Work, and such changes in the Work will be made as required to accept the substitution and to ensure the Work is complete in all respects. The cost of changes in the Work necessary to incorporate a proposed substitution is to be included in any proposed increase or decrease to the Contract Price associated with the proposed substitution.

.4 Do not substitute materials, equipment or methods unless such substitutions have been specifically approved in writing prior to the close of tenders by the Consultant.

.5 The Owner reserves the right to accept or reject, at its sole discretion, any proposed substitution.

1.4 Workmanship

.1 All work shall be carried out in accordance with the best trade practice, by mechanics skilled in the type of work concerned.

.2 Products, materials, systems and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the applicable manufacturer's printed directions.

.3 Where specified requirements are in conflict with manufacturer's written directions, follow manufacturer's directions, but inform the Consultant in writing prior to proceeding with affected work. Where specified requirements are more stringent than manufacturer's directions, comply with specified requirements.

Cleaning

1.1 General Requirements

.1 Be responsible for cleanliness of the project to satisfaction of the Consultant. Maintain work in neat and orderly condition and free of ice and snow at all times.

.2 Remove from site and legally dispose of rubbish and waste materials.

.3 Burning or burying of rubbish and waste materials on site is not permitted.

.4 Use only cleaning materials recommended by manufacturer of surface to be cleaned.

.5 Use cleaning material only on surfaces recommended by cleaning material manufacturer.

1.2 Cleaning During Construction

.1 Remove debris, packaging and waste materials on a daily basis.
.2 Keep dust and dirt to an acceptable level.

.3 Remove oily rags, waste and other hazardous substances from premises at close of each day, or more often if required.

1.3 Final Cleaning

.1 Upon completion of the Work, clean all surfaces and components utilizing the services of a professional cleaning company. Provide professional cleaning of all areas and surfaces to allow Owner to occupy without further cleaning.
.2 Remove stains, dirt and smudges from finished surfaces.

.3 Clean wall, ceiling and floor surfaces in accord with respective material manufacturer's recommendations.

.4 Clean glass, remove stickers and paint; leave glass in spotless, polished condition; use cleaning liquids only.

.5 Clean and polish hardware.

.6 Clean mechanical and electrical fixtures and other fittings of labels, wrappings, paper and other foreign material.

.7 Replace heating, ventilation and air conditioning filters.

.8 Clean ducts, blowers and coils.

.9 Upon completion of project, prior to Total Performance. Remove from site all waste and surplus materials.

Warranty Inspection

1.1 The Contractor shall organize a warranty inspection to take place two weeks prior to the expiration of the standard one-year warranty. The Consultant, sub-consultants and trade contractors, the Contractor, and the Owner's representatives shall attend.

1.1 Reference Standard

.1 Comply with provisions of OAA, OCGA Document No. 100, December 2007 “Take-Over Procedures” except as modified herein or elsewhere in the Contract Documents.

1.2 Operating and Maintenance Manuals

.1 Provide USB Flash Drive and one (1) hard-copy of operating and maintenance data. Prepare hard-copy on 8 1/2” x 11” sheets in printed or typewritten form, contained in D-ring binders with soft vinyl covers.

.2 Manual contents shall be assembled in systematic order, generally following the specification format. Provide labelled, celluloid covered tabs fastened to hard paper dividers to identify different Sections.

.3 Binders all have clear plastic pocket at back of spine for identification. Insert label containing title “Operating and Maintenance Data”, project name and volume number if applicable.

.4 Include the following material in each manual:

.1 Title sheet labelled “Operating and Maintenance Data” and listing project name, date, volume number, if applicable and names and addresses of Design-Build Contractor, and consultants.

.2 List of contents. If more than one volume is required, provide a cross-reference contents page at front of each volume.

.3 Complete list of subcontractors and suppliers.

.4 Copy of finish hardware list, complete with all amendments and revisions.

.5 Schedule of paints and coatings. Include sufficient explanation to fully identify each surface with the applicable paint or coating used. Enclose copy of colour schedule.

.6 Maintenance instructions for all finished surfaces.

.7 Brochures, cuts of all equipment and fixtures.

.8 Operating and maintenance instructions for all equipment.

.9 Valve manual.

.10 Controls schematics.

.11 Extended warranties.

.12 Maintenance contracts.

.13 Other data required elsewhere in Contract Documents or deemed necessary by Consultant.

1.3 Record Drawings

.1 The Contractor shall provide marked-up As-Built Drawings as specified on Section 01200

.2 The Consultant shall create and/or update the Project CAD Drawings, based on the As-Built Drawings and the Contract Drawings including all revisions, changes, deletions, and additions made during the course of the Work, and provide the following Record Drawings to the Owner:

.3 Submit to the Owner on a USB Flash Drive and one (1) hard copy, prior to application for Final Payment:

.1 PDF copy of all drawings listed on the List of Drawings
.2 CAD files of all drawings listed on the List of Drawings broken down into separate folders by discipline (architectural, site, structural, mechanical, electrical)
.3 CAD files shall include: All x-refs, objects, blocks and images bonded into the drawings
.4 Plot style
.5 CAD files to be saved in 2014 CAD version or earlier
.6 Submit one bound full-size paper copy of all Record Drawings with the words “RECORD DRAWINGS” indicated on the cover sheet and in all of the revision bars in the title block of each Drawing.
.7 The cost for the Consultant to prepare Record Drawings, including printing charges, shall be paid by the Contractor from the cash allowance specified in Section 010 20–Allowances.

1.4 Maintenance Materials

.1 Deliver to site, unload and store where directed, maintenance materials as required elsewhere in these Specifications. Obtain receipt from Owner for delivered materials and submit copy of receipt to the Consultant.

.2 Package materials so that they are protected from damage and loss of essential properties.

.3 Label packaged materials for proper identification of contents.

1.5 Operating Instructions

.1 At Substantial Performance, at a time acceptable to Owner, but not before operating and maintenance manuals have been reviewed and accepted by the Consultant, instruct Owner’s representatives in the operation of all systems and equipment.

.2 Coordinate training sessions for each type of operating system and equipment with qualified instructors and attendance of relevant subcontractor.

1.6 Substantial Performance

.1 Advise the Consultant in writing when the work has been substantially completed.

.2 Prior to requesting a Substantial Performance submit the following on a USB Flash Drive and one (1) hard copy:

.1 Operating and maintenance manuals.

.2 Inspection and acceptance certificates required from regulatory agencies.

.3 Upon agreement of the Consultant that substantial Performance has been achieved, prepare a complete list of deficiencies and submit list to the consultant.

.4 Re-issue an updated deficiency list incorporating additional deficiencies identified during the inspection.

.5 The Owner will take over and occupy the building upon completion, inspection and acceptance of the work.

1.7 Final Submission

.1 Prior to claiming final payment:

.1 Submit record drawings

.2 Submit USB Flash Drive and one (1) hard copy on the following:

.1 Complete set of reviewed shop drawings of mechanical and electrical items, folded to 8 1/2” x 11” size, contained in heavy duty manila envelopes, numbered and labelled. Follow specification format with no more than one Section per envelope.

.2 Heating and ventilating systems balancing reports.

.3 Replacement materials.

.4 Consultant’s final deficiency lists.

.3 Upon completion of all items noted on the deficiency list, clean all areas, surfaces, and components affected by corrections and completion of deficient items.

.4 Ensure that all services, equipment, apparatus are properly tested and adjusted.

.5 Deliver replacement materials to a location determined by the Consultant.

1.1 The Owner shall hire a Commissioning Consultant (CC) who will provide services and conduct tests as identified in the specification.

1.2 The Commissioning Consultant shall hire an Independent Contractor who will balance the air and water systems as identified in the specifications.

1.3 The Contractor shall be responsible for the commissioning process identified in the mechanical specification 15020, electrical specification 16020 and controls specification.

1.4 The Contractor shall provide all material, equipment and instrumentation to complete the Contractors' commissioning process specified.

1.5 The Contractor shall co-ordinate the mechanical and electrical work and will supervise the Mechanical an Electrical Contractor's commissioning work specified in Division 15010 and 16010.

1.6 The Contractor shall provide a commissioning schedule, which shall identify all tests to be performed. The schedule shall be in three parts. Part one shall be a master commissioning schedule, part two shall be a detailed mechanical commissioning schedule, and part three shall be a detailed electrical commissioning schedule.

1.7 The master-commissioning schedule shall clearly identify when permanent power will be available and when the building will be clean enough to operate the air-handling units.

1.8 The Contractor shall ensure co-ordination and co-operation between divisions and trades to complete the commissioning process.

1.9 The Contractor shall ensure all tests identified are conducted; the associated forms completed and forwarded to the Consultant.

1.10 The Contractor shall ensure the building and systems are ready for testing and that the building is clean and safe for equipment operation.

1.11 The Contractor shall prepare the building and documentation for the acceptance procedure when all systems have been completed and tested.

1.12 The Mechanical Contractors commissioning process shall be allocated a value equal to 7% of the mechanical contract. The mechanical contractors may draw from this allocation as the commissioning process is completed. The mechanical contractors shall submit all test and verification forms. The Consultant will use these forms to calculate percentage complete.

.1 Mechanical Contractor Commissioning – Break Out

Shop Drawings	½
Drainage test	½
Domestic Water Piping Pressure Test	½
Heating Piping Pressure Test	½
Chilled Water Piping Pressure Test	¼
Ductwork Pressure Test	½
Equipment Start up	¾

Manufacturers Start up	¾
Performance Tests	2
Training	¼
O & M Manuals	¼
As built Drawings	¼
Total	7% of the mechanical price

.2 The mechanical contractor may claim up to 5% of the contract from this allocation leading up to performance testing. The remaining 2% shall not be paid out until performance testing, O & M manuals and training have all been completed satisfactorily.

1.13 The Electrical Contractors commissioning process shall be allocated a value equal to 4% of the electrical contract. The electrical contractors may draw from this allocation as the commissioning process is completed. The electrical contractors shall submit all test and verification forms. The Consultant will use these forms to calculate percentage complete.

.1 Electrical Contractor Commissioning –

Break Out Shop Drawings	½
Cable Testing	¼
Electrical Distribution	½
Lighting Distribution	½
Co-ordination Study	¼
Fire Alarm Test	1
Security	¼
Training	¼
O & M Manuals	¼
As Built Drawings	¼
Total	4% of the electrical price

1.14 The Controls Contractors commissioning process shall be allocated a value equal to 3% of the controls contract. The controls contractors may draw from this allocation as the commissioning process is completed. The controls contractors shall submit all test and verification forms. The Consultant will use these forms to calculate percentage complete.

.1 Controls Contractor Commissioning

Break Out Shop Drawings	½
Performance Tests	2
O & M Manuals	¼
As Built Drawings	¼
Total	3% of the control price

1.15 The contractor may claim up to 1% of the contract from this allocation leading up to performance testing. The remaining 2% shall not be paid out until performance testing and O & M manuals have all been completed satisfactorily.

SCHEDULES

ROOM FINISH SCHEDULE

TO BE READ IN CONJUNCTION WITH ROOM FINISH SCHEDULE ON DRAWINGS AND ALL PLANS,ELEVATIONS, DETAIL DRAWINGS, ETC.

List of Abbreviations and Materials:

ACT	Acoustic Ceiling Tile (24" x 48" existing)
ARF	Athletic Resilient Flooring
CA	Clear Anodized
Cab	Cabinet / Millwork
CB	Chalkboard
Conc	Concrete
CMU	Concrete Block
C-Board	Cement Board
CP	Control Panel
Cpt	Carpet
CT	Ceramic Tile
Gl	Glass
GB	Gypsum Board
GWG	Georgian Wired Glass
Met	Metal
Pt	Paint
Pl	Plaster
P-lam	Plastic Laminate
R	Rubber
Res	Resilient Sheet Flooring
TB	Tackboard
Terr	Terrazzo
VCT	Vinyl Composition Tile
WB	White Board
Wd	Wood
WP	Waterproofing

GENERAL FINISH NOTES:

a) Walls shown painted shall be properly prepared including removal of existing wall coverings, adhesives, paneling, etc. unless finishes noted to be retained.
b) Make good all existing finishes where new work joins.
c) All existing and new walls and previously painted finishes to be re-painted.
d) Remove all metal grilles, to be cleaned and re-painted for re-use where indicated.
e) All heating units, recessed convectors, grilles, pipes, access panels, hangers and miscellaneous exposed metal work (other than stainless steel, anodized aluminum and baked enamel) to be painted to match the surfaces on which they occur, unless otherwise directed by Architect.
f) All exposed structural steel and mechanical ducts in finished areas to be painted.
g) Existing floor finishes to be removed. Make good subfloor to receive new finishes.
h) All hollow metal door frames, guard rails, and nosing of steel stairs shall be epoxy painted.
i) All masonry and drywall shall be extended to u/s steel deck to provide fire rated separations as noted on drawings.
Where walls run parallel and under OWSJ, the OWSJ shall be enclosed both sides with gypsum board to provide rated separations and sound barrier between rooms.
j) All exposed concrete floor surfaces finished with sealer.
k) All exposed concrete block corners shall be bull nose block.

HARDWARE SCHEDULE

Rivett Architectural Hardware Ltd.
Hardware Schedule

R.S McLaughlin - NEW TECH OFF. - 570 STEVENSON RD N, OSHAWA

Schedule 200626 Date Apr 13/23

Door Number 249 Set Number 1

Set # 1
1 SGLE. DR. # 249 EXISTING CORRIDOR 2000 TO NEW TECH. OFFICE 2249 LHR
1 - 1000 x 2080 x 45 x PSF x HMD x 45 MIN RATED
Qty
3 EA HINGE BB1168-114 X 101-NRP-626
1 EA CLASSROOM LOCK C/W INDICATOR L9071P X 03B X L283-711 X 626
1 EA CLOSER 4040XP X 689
1 EA CONCEALED STOP 105S X 630
OVERHEAD STOP @ 110 DEGREE OPEN
1 EA KICKPLATE 190S X 203 X 963 X 630

LIMITED DESIGNATED SUBSTANCE SURVEY REPORT (Building Finishes Upgrades Project)

*NOTE:

1. The following documents for designated substance survey have been prepared by the Durham District School Board and their Environmental Consultant.

HAZARDOUS MATERIALS REPORT

1. **CONTENTS**

1.1 Report

1.1.1 LIMITED DESIGNATED SUBSTANCE SURVEY REPORT (Phase 2 Building Finishes Upgrades)

RS McLaughlin CVI
570 Stevenson Road North, Oshawa, Ontario. L1J 5P1

dated: March 1, 2023

Prepared by: Maple Environmental Inc

Performed for: Durham District School Board

Guideline – Silica on Construction Projects (issued by Ministry of Labour – Province of Ontario)
Contractor may obtain document from the Ministry of Labour web site at:
https://www.labour.gov.on.ca/english/hs/pubs/silica/

1.2 **ENVIRONMENTAL**

1.3 The work under this contract shall not start before the abatement of the hazardous materials is finished. All architects, consultants, contractors and subcontractors shall familiarize themselves with the location of asbestos-containing materials by reviewing the asbestos survey. If any asbestos is found during the work under this contact where there is the possibility of disturbance of the asbestos-containing material(s), the Contractor shall stop all work and immediately consult with the Architect.

1.4 The Contractor is to deal with asbestos in strict accordance with requirements of the Asbestos Regulations 278/05 made under the Occupational Health and Safety Act including any subsequent amendment to these Ontario Regulations.

1.5 The report, by its nature, cannot reveal all conditions that exist or can occur on the site. Should suspected materials-containing hazardous materials be encountered or likely to be disturbed during the course of construction, the work is to be stopped, the suspect area is to be covered and the Contractor is to contact the Environmental Consultant or the Board immediately. The Board will direct the process for remedial action.

1.6 Unidentified materials suspected of containing hazardous materials discovered in the course of the Work shall be treated as hazardous materials containing or confirmed by bulk analysis to be non-hazardous materials prior to disturbance, removal or handling.

1.7 Observe the requirements of the Ministry of Labour Regulation 654/85 or the Toronto District School Board hazardous materials work procedures for all work involving the disturbance, removal or handling of hazardous materials.

2. **HAZARDOUS MATERIALS: GENERAL**

2.1 Other Designated Substances:

HAZARDOUS MATERIALS REPORT

Designated substances other than asbestos may be present on this project. Refer to the Designated Substance List for the designated substances present at the site.
Other materials that may be present in the area of construction may include any or all of the following and would be expected in normal construction:

.1 Lead found in paint films, in solder or pipe for drinking water, in solder for other pipe or electrical components;
.2 Mercury found in elemental form in an ampoule in thermostats or in electrical soft switches, as a gas in fluorescent light tubes or in paint films and caulk; and
.3 Silica, primarily as Quartz, bound in building materials including but not limited to concrete, brick and block.
.4 Also note avoidance of other products noted below.
.5 In accordance with the Ontario Health and Safety Act and regulations enacted under the Act the Contractor and sub-trades shall take appropriate precautions for the building and their work force. Such precautions may include for the substances listed following:

Lead:

I. Any operation involving lead-based paints may potentially produce significant exposures to lead if adequate controls are not provided. Exposure varies with the type of operation being employed.
II. The presence of lead in building finishes left intact or found peeling in a few locations produces little exposure for workers to lead through contact, inhalation or ingestion.
III. Operations involving the hand sanding and scraping of lead based paints can elevate exposure through inhalation. The use of a negative pressure respirator equipped with high efficiency particulate air (HEPA) filters is recommended to reduce exposure.
IV. Operations involving the machine sanding or abrasive cutting of paint and other surface coatings containing lead can elevate levels of much finer dust. The spray application of a lead bearing paint or coating produces a respirable fume. These operations increase the likelihood of exposure by inhalation. A negative pressure air-purifying respirator equipped with HEPA filters is recommended for these operations.
V. Operations involving oxyacetylene torches or other heating operations produces the most significant exposure to lead in particular through inhalation and by contact of lead fumes solidifying on skin. A powered air-purifying respirator equipped with HEPA filters and full body covering is recommended for these operations.
VI. Lead found in solder of other pipe systems and electronic components poses no threat to the work force by inhalation, ingestion or by contact with the exception of maintenance or renovation activities. The maintenance of the pipe or electrical component may produce some exposure to lead fume during the sweating on of lead solders but for a short duration of time. Inhalation is the source of entry and exposure is not very significant.
VII. All items identified in this section may be disposed of as regular non-hazardous waste unless concentrated. Metallic lead may be reclaimed through scrap metal dealers.

Mercury

.1 Fluorescent light tubes contain small quantities of mercury gas. These sealed units do not pose any harm in the workplace except in the case of breakage. There are no liquid or residue present after breakage and spill cleaning is not a concern. A recommended practice is to evacuate the work area when breakage occurs. The gas will diffuse in about five to ten minutes and cleanup of the tubes can be performed. Mercury can be taken into the body by inhalation only from this source.
.2 The same precautions as those indicated for lead-based paints would apply to mercury in paints.

.3 Elemental mercury found in ampoules in electrical equipment may be disposed of as regular waste and should be turned over to the Board for disposal through commercial recyclers; Contractor is to collect tubes, box, for disposal without breaking. The other forms (light tubes and painted surfaces that have not been concentrated) can be disposed of as regular waste.

Silica

.1 Silica is presumed to be present in cement, cement blocks, bricks and mortar of the building. Unless the silica in these materials is reduced to respirable size (5 um or less) and the airborne concentration exceeds the time weighted average exposure of 0.2 milligrams per cubic metre in air, no adverse health effects are expected to occur. Building construction, renovation or demolition do not normally raise excessive exposure to silica with the exception of jack hammering, dry saw cutting or sand blasting. There is little likelihood for the work force to be exposed to excessive levels of respirable silica dust if the material is suppressed with water spray or flow. Respiratory protection is dependent on the type and airborne concentration of respirable silica present in the particular work environment.

2.2 Prior to the disposal of building materials a leachate toxicity test in compliance with Waster Management Regulation (Revised Regulation of Ontario 1990 / Regulation 347) may be required by the local waste receiving site or the Ontario Ministry of Environment and Energy. Prior to disposal these authorities should be consulted with and tests performed where required.

2.3 Where a friable building material **enclosed in a wall, floor or ceiling** such as fireproofing, insulation on pipe or ducts etc. (that is not fibrous glass) or an acoustical textured material (stucco) or a non-friable material such as cement board or cement pipe. The Contractor or his sub-trades shall stop all work and contact the Board’s Hazardous Materials Consultant for this project further direction.

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

LIMITED DESIGNATED SUBSTANCE SURVEY REPORT
(Phase 2 - Building Finishes Upgrades)

R.S. McLaughlin CVI
570 Stevenson Road North,
Oshawa, Ontario

Presented to:
Durham District School Board
400 Taunton Road East
Whitby, Ontario
L1R 2K6

Attention: Rick Racioppa

March 1, 2023

Maple Project No. 20771

482 South Service Rd. E. • Suite 116 • Oakville • Ontario • L6J 2X6 • Tel: 905-257-4408 • Fax: 905-257-8865
www.MapleEnvironmental.com

EXECUTIVE SUMMARY

Maple Environmental Inc. ('Maple') was retained by the Durham District School Board ('DDSB') to perform a survey for Designated Substances as well as polychlorinated biphenyls (PCBs) and mould within the selected areas of R.S. McLaughlin CVI located at 570 Stevenson Road North, Oshawa, Ontario (the 'Site'). It is our understanding that the building requires a survey to identify possible hazardous building materials that may be disturbed during the renovations of the selected areas.

The survey was limited to the Dark Room (Room 2249), Classroom (Room 2250), Weight Room (Room 2253), Wood Shop (Room 2255), Welding Shop (Room 2256), Control Room (Room 2258A) and Work Room (Room 2266), as indicated by the Drawings provided by DDSB for the Building Finishes Upgrades Project Phase 2.

Asbestos

Asbestos-containing materials (ACM) identified within the Surveyed Areas at the time of the assessment are as follows:

- Pipe Insulation (Parging Cement Fittings and Pipe Straights);
- Tar insulation on Dust Collector Duct; and
- 1' x 1' Acoustic Ceiling Tile; and
- Grey 9" x 9" Vinyl Floor Tiles.

It should be noted that due to the presence of solid walls and ceilings (i.e. masonry walls and above solid ceilings) throughout the survey area, access for viewing within the wall and ceiling cavities was not always possible. Suspect asbestos-containing materials may be present within wall and ceiling cavities that were not identified in this report but are suspected to be present. Caution should be taken when demolishing solid walls and ceilings within the areas being surveyed.

Lead

Bulk samples collected of the predominant paint colours indicate that the brown paint on dust collector is "Lead-Containing". The balance of paints sampled are considered to be "Low-Level Lead" (virtually safe).

It should be noted that lead may also be present in wiring connectors, electric cable sheathing, solder joints on copper piping, ceramic glazes, lead sheeting, masonry mortar, and as sub-surface layers to the most recent paint layers currently applied, where present at the Site.

Mercury

Mercury vapour is present in all fluorescent light tubes. Liquid mercury is also present in thermostatic switches located within the surveyed area.

Silica

Free crystalline silica, present as common construction sand, is present in all concrete and masonry products where present within the surveyed areas.

Mould

No visible mould was observed within the surveyed areas at the time of the assessment.

Staining was observed on ceiling tiles and drywall ceilings within various areas of the surveyed area.

It is possible that mould growth is present in concealed areas such as wall or ceiling cavities, pipe chases, etc. or in areas not currently assessed by Maple. The client should notify Maple should any water damage or suspect mould growth be discovered.

PCBs

The fluorescent lamp fixtures observed contained T8 fluorescent light tubes. T8 fixtures have electronic ballast and are considered as not containing PCB.

RECOMMENDATIONS

Based on the Laboratory Analytical Results and observations made on Site, Maple provides the following recommendations.

- Remove all asbestos-containing materials using the appropriate asbestos abatement procedures as outlined in Section 5.0 prior to the planned renovation.
- Disturbance of paints that are considered “Lead-Containing” or “Low-Level Lead” paint finishes (0.1% or less) should be completed using Lead Abatement Procedures as appropriate in accordance with EACC and Ministry of Labour Guidelines as outlined in Section 5.0 prior to the planned renovation.
- Remove all mercury containing components (including fluorescent light tubes) prior to renovations if the materials are being removed. These components should be removed intact and disposed of appropriately.
- Proper dust suppression techniques and other safety precautions to control possible generation of silica dust from the demolition of concrete and masonry products present in the surveyed area should follow those outlined in the Ministry of Labour Guideline- Silica on Construction Projects, 2004.
- Using Level 1 Mould Remediation Procedures, consider removal and replacement of the stained ceiling tiles present in the surveyed areas.
- Should light fixtures containing ballasts be removed as part of the project, all ballasts not clearly marked as “non-PCB” on the label should be separated, handled and disposed of as PCB-containing or inspected by competent persons to ascertain PCB content.

Appropriate procedures for lead, mercury and silica must be observed if these materials are likely to be disturbed by scheduled renovations. Please refer to Section 5.0 of the report to review the required procedures.

Consideration should be given to assessing other areas of the building that could be associated with the current project, including travel path, mechanical or electrical ties in the areas outside of the immediate project area, and penetrations through the slab impacting floors below or above.

TABLE OF CONTENTS

1.0 INTRODUCTION

Maple Environmental Inc. ('Maple') was retained by the Durham District School Board ('DDSB') to perform a survey for Designated Substances as well as polychlorinated biphenyls (PCBs) and mould within the selected areas of R.S. McLaughlin CVI located at 570 Stevenson Road North, Oshawa, Ontario (the 'Site'). It is Maple's understanding that the selected areas of the building require a survey to identify possible hazardous building materials that may be disturbed during the renovations of the areas surveyed.

The survey was limited to the Dark Room (Room 2249), Classroom (Room 2250), Weight Room (Room 2253), Wood Shop (Room 2255), Welding Shop (Room 2256), Control Room (Room 2258A) and Work Room (Room 2266), as indicated by the Drawings provided by DDSB for the Building Finishes Upgrades Project Phase 2.

Section 30 of the Ontario Occupational Health and Safety Act requires that the following Designated Substances be included in a Designated Substance Survey:

Asbestos
Lead
Mercury
Silica
Isocyanates
Vinyl Chloride Monomer
Benzene
Acrylonitrile
Coke Oven Emissions
Arsenic
Ethylene Oxide

Additional detailed information with respect to asbestos was collected at the time of the survey to ensure compliance with Ontario Regulation 278/05.

The assessment was performed by Richards Reboks of Maple on January 31, 2023.

2.0 APPLICABLE ONTARIO REGULATIONS

Applicable Ontario Regulations for each of the materials included in the investigation are briefly described below.

2.1 Designated Substances and Other Hazardous Materials

Section 30 of the Occupational Health and Safety Act requires building owners or their agents (architects, general contractors, etc.) to prepare or have prepared a Designated Substance report for specified potentially hazardous materials possibly present in a facility. The owner must ensure that a prospective constructor has received a Designated Substance report before entering into a binding contract with the contractor. The owner is liable to the contractor for damages and costs arising from unreported materials (of which the owner should reasonably have been aware) and could also be subject to orders and fines from the Ministry of Labour.

The disturbance of asbestos materials on construction projects is controlled by Ministry of Labour Regulation R.R.O. 2005/278. The disposal of asbestos waste is controlled by Ministry of Environment Regulation, R.R.O. 1990/347.

There are no specific Ministry of Labour regulations for control of the other Designated Substances on construction projects. However, the Ministry of Labour actively enforces the general duty clause of the Health and Safety Act which protects workers and provides guidance on exposure monitoring, permissible exposure levels, medical monitoring, etc. for all Designated Substances.

Although Regulations exist for many of the Designated Substances, they apply to industry settings using Designated Substances in manufacturing processes, and do not apply to general property management, renovation or maintenance of buildings.

Polychlorinated Biphenyls ("PCBs") and mould were also included in the investigation, which are not specifically named as Designated Substances. No specific regulations are attached to these materials but are generally governed by the due diligence section of the Health and Safety Act for employers to protect their workers.

2.2 Ontario Regulation 278/05 (Asbestos)

Ontario Regulation 278/05 applies to buildings with regards to maintenance, renovations or demolition work where asbestos-containing materials (ACM) is present and may be disturbed. The Regulation requires that a detailed asbestos inventory be performed in all buildings where friable and non-friable asbestos materials are present. The inventory must be available at the work place and must identify the type of asbestos, and location of asbestos on a room-by-room basis. The following report meets or exceeds the requirements for an asbestos survey under Ontario Regulation 278/05.

In addition, the regulation requires all buildings where asbestos has been used as part of the building to implement an Asbestos Management Program (AMP).

2.3 Ontario Regulation 347

Ontario Regulation 347 applies to the transport of waste from the location of generation to a landfill site authorized to receive specific wastes. The regulation also prescribes procedures on how the specific wastes are to be handled at the landfill site.

The major requirements of the building owner and the person(s) removing the waste are to ensure that:

- The waste is appropriately packaged and labelled;
- The transport vehicle is appropriately placard; and
- The waste is to be transported as directly as possible to the landfill site once it leaves the site.

Some wastes require the owner to register a Generator (of waste) number and many wastes require classification that can restrict or even prohibit their disposal in landfill.

It is important to note that the building owner can be held responsible for the waste until the waste disposal site accepts it.

2.4 Ontario Regulation 362

Ontario Regulation 362, made under the Ontario Environmental Protection Act applies to the waste management and transport of PCB waste from the location of generation to a landfill site authorized to receive specific wastes. The regulation also prescribes procedures on how the specific wastes are to be handled at the landfill site.

3.0 SURVEY SCOPE AND METHODOLOGY

The survey was limited to the Dark Room (Room 2249), Classroom (Room 2250), Weight Room (Room 2253), Wood Shop (Room 2255), Welding Shop (Room 2256), Control Room (Room 2258A) and Work Room (Room 2266), as indicated by the Drawings provided by DDSB for the Building Finishes Upgrades Project Phase 2. The methodology included the assessment for hazardous materials and how the assessment was performed is outlined below.

In order to determine the location of materials included in the assessment, the project technologist entered the room where practical (i.e. where access was possible without the demolition of walls, roof or ceilings or destruction of flooring). Representative views were made above accessible suspended ceiling systems. Cavities within solid ceiling and wall systems were accessed via existing access panels only. The inventory did not include demolition of building systems or finishes to check on possible hidden conditions.

3.1 Asbestos-Containing Building Materials (ACM)

The scope of the survey included all friable asbestos products and all major non-friable asbestos materials. The term friable is applied to a material that can be readily reduced to dust or powder by hand or moderate pressure. Asbestos materials that are friable have a much greater potential to release airborne asbestos fibres when disturbed.

Typical friable asbestos materials include: sprayed fireproofing or thermal insulation, textured (stippled) plaster, and thermal mechanical insulation. Typical non-friable materials include: asbestos cement (transite) products, vinyl floor tiles, asbestos textiles and gaskets. Additional materials such as ceiling tiles, drywall joint compounds and vinyl sheet flooring are classified as non-friable, but because of their ability to release dust when disturbed are considered as “potentially friable” for the purpose of this report.

Bulk samples of materials suspected to contain asbestos were collected for analysis during the survey. Specifically, a small volume of material was removed either from a damaged section of suspect material or taken from intact material. In these latter cases, the material from which the sample was collected was sealed with tape to temporarily prevent fibre release. Samples were placed in plastic bags and sealed until receipt by an independent laboratory. To ensure quality results, the independent laboratory chosen successfully participates in an "Asbestos Proficiency Analytical Testing Program". As such, these independent laboratories are responsible for their findings.

Bulk samples were collected in accordance with regulatory sampling requirements and with sufficient frequency to obtain a general pattern of asbestos use within the building. Due to building renovations or modifications that may have occurred in the past, the consistency of the application of asbestos materials may not be uniform throughout the entire Site. It is important to note that without sampling each individual wall, pipe section, ceiling tile etc. it is not possible to identify the asbestos content of every material present in the selected areas. For this reason, visually similar materials are considered to be homogenous with those already sampled elsewhere in the building without additional analysis.

O. Reg. 278/05 prescribes that a minimum number of samples be collected of materials suspected to contain asbestos. These minimum sampling requirements are summarized in Table 1, below.

Table 1 - Suspect ACM Bulk Sampling Requirements

Type of Material	Quantity of Material Present	Minimum # of Bulk Samples Required
Surfacing Materials (i.e. sprayed fireproofing, drywall joint compound, texture coat, and plaster)	Up to 90 sq. m. (1000 sq. ft.)	3
	From 90 sq. m. (1000 sq. ft.) to 450 sq. m. (5000 sq. ft.)	5
	Greater than 450 sq. m. (5000 sq. ft.)	7
All other potential ACM	Any	3

Excluding surfacing materials, the laboratory was instructed to cease analysis within Sample Groups of homogenous materials when one of the samples in the group is found to contain asbestos. For example, if three samples of a type of vinyl floor tile are collected (as required by O. Reg. 278/05) and submitted for analysis and the first sample is positively identified as containing asbestos, the balance of the sample group is not analysed.

EMC Scientific Inc. ('EMC'), an independent laboratory, was selected to analyse the collected bulk suspect asbestos samples. EMC successfully participates in an "Asbestos Proficiency Analytical Testing Program" and as such, is responsible for its findings. EMC followed the Code of Practice for the identification of asbestos in bulk material, as detailed in O. Reg. 278/05. Bulk samples were analysed using the Polarized Light Microscopy ("PLM") Technique with Dispersion Staining. The identification of asbestos fibre in bulk material is based on a collective set of parameters dependent on the unique shape and crystallographic properties of each fibre as viewed through the microscope.

This method is useful for the qualitative identification of asbestos and the semi-quantitative determination of asbestos content in bulk materials expressed as a percent of projected area. The method identifies types of asbestos and also measures percent of asbestos as perceived by the analyst in comparison to standard area projections or trained experience.

The recommendations made as part of this report with respect to asbestos have taken into consideration: the condition and accessibility of the material, vibration, air movement, and general activities likely to occur within the vicinity of the ACM.

In each area or room inventoried, the technician recorded the quantity, condition (GOOD, FAIR, or POOR) of each suspect asbestos-containing material.

The definitions for condition and accessibility of the asbestos-containing items are as follows:

GOOD Material is intact with no visible signs of damage.

FAIR Material is visibly damaged but can be repaired.

POOR Material is damaged beyond repair and likely needs to be removed.

Where ACM is found to be in GOOD condition and not likely to deteriorate or fall, the general recommendation would be to re-evaluate the condition of the material on an annual basis (required by O. Reg. 278/05). This recommendation can be subject to change if the material is located in a manner that persons untrained in asbestos awareness could physically damage it.

Where ACM is found to be damaged (i.e., FAIR or POOR condition), a recommendation to have the material cleaned-up, repaired, removed, enclosed, or encapsulated is offered. The recommendation will also indicate which asbestos procedure should be used to perform the remedial work (i.e., Type 1, Type 2, Type 3, or Glove Bag Removal Methods).

3.2 Lead

The investigation included the collection and analysis of all major paint colour applications for the presence of lead in the paint. Other materials that possibly contain lead were identified by known historic use, where relevant. The lead in paint samples were analysed by EMSL Canada ('EMSL'), using atomic absorption spectrophotometry. EMSL is AIHA (American Industrial Hygiene Association) and NIOSH (National Institute of Occupational Safety and Health) accredited for this type of analysis. The Laboratory Analysis Report for lead in paint samples is included with this Report as Appendix II.

3.3 Mercury

The assessment included a visual identification of fluorescent light tubes, switches, electrical controls, heating system thermostats, thermometers, and other components historically known to contain mercury.

3.4 Other Designated Substances

Other materials listed in Section 1.0 of this Report were identified on a visual basis where present, as part of the current assessment. It should be noted that no manufacturing or heavy industrial activities are known by Maple to occur at the Site. Therefore, Designated Substances associated with these activities (i.e. those other than Asbestos, Lead, Mercury, and Silica) would not be expected to be present in the selected areas.

3.5 Mould

The assessment for mould was conducted in accordance with standard industry practice as set out in the Canadian Construction Association (CCA) "Mould Guidelines for the Canadian Construction Industry" for a visual assessment. Although there are no regulatory requirements in Ontario for such an assessment, the CCA Guidelines, and similar guidelines from other agencies have been accepted as the industry standard by most experts, consultants, the Ontario Ministry of Labour, and the Canadian Construction Association.

All guidelines and protocols for mould investigations indicate that investigations should be performed largely on a visual basis with limited collection of bulk and/or air samples. The Ontario Ministry of Labour has consistently enforced the removal of all mould from buildings regardless of mould genus or species, and therefore bulk samples or air samples for confirmation of mould are not typically collected for investigative purposes where mould is visible.

3.6 Polychlorinated Biphenyls

Manufacturer's labels/codes collected from fluorescent lamp ballasts suspected of containing Polychlorinated Biphenyls ("PCBs") are compared with Environment Canada's document titled "Identification of Lamp Ballasts Containing PCBs", which identifies PCB-containing ballasts.

3.7 Limitations and Omissions from Scope

Due to the nature of building construction some limitations exist as to the possible thoroughness of any building materials inventory. The field observations, measurements, and analysis are considered sufficient in detail and scope to form a reasonable basis for the findings presented in this report. Maple warrants that the findings and conclusions contained herein have been made in accordance with generally accepted evaluation methods in the industry and applicable regulations at the time of the performance of the inventory.

It is possible that conditions may exist which could not be reasonably identified within the scope of the inventory or which were not apparent during the Site investigation. Maple believes that the information collected during the investigation concerning the property is reliable. No other warranties are implied or expressed.

During a standard ACM inventory performed for the purposes of regulatory compliance, it is industry practice to exclude certain suspect asbestos-containing materials from sampling. These materials are often excluded from sampling due to the risk of compromising the health and safety of the technician, other building occupants, or the integrity of the systems with which these materials are associated. Examples of such materials include; elevator brakes, roofing felts and mastics, Secondary voltage wiring, mechanical packing and gaskets, underground services or piping, fire-doors, window caulking and levelling compound. Where observed, these materials were presumed to be ACM.

3.8 Drawings

Drawings included in Appendix III will indicate the locations of any major applications of an asbestos-containing material with the exception of mechanical insulations, drywall, plaster finishes and transite (which cannot be accurately depicted on drawings). The information depicted on the drawings is not to scale and is only meant to provide a general location of asbestos-containing materials.

3.9 Previous Reports

Where possible, Maple utilized the observations and representative bulk sampling results from previous Survey Reports that were made available at the time of the survey. Maple utilized sampling data from the following sources:

- February 2022 – Maple Environmental Inc. (Maple Project 20015) – Limited Designated Substance Survey Report (Phase 1).
- October, 2017 – Maple Environmental Inc. Project 16312-129 – Detailed Asbestos-Containing Building Materials Survey, and
- April 2017 – Maple Environmental Inc. (Maple Project 16227) – Limited Designated Substance Survey Report.

4.0 INVENTORY FINDINGS

The findings of the survey are presented separately below for each of the eleven Designated Substances as well as microbial growth (mould), and polychlorinated biphenyls. Asbestos is further detailed by typical applications of asbestos.

4.1 Asbestos

The following is a brief discussion of the extent to which ACM was identified in the surveyed area. The discussion is organized under the headings of materials that are generally suspected of containing asbestos. The sample numbers refer to the laboratory analysis report presented as Appendix I and summarised in Table 2 below. Eighteen (18) bulk samples were collected during the current assessment for the determination of asbestos content and submitted to the lab to be analysed. Due to the presence of more than one phase of material in some of the original samples the laboratory may have performed multiple analyses for some samples. In addition, some of the samples may not have been analysed due to the positive confirmation of asbestos in a previous sample of the same material during analysis. As a result, a total of eighteen (18) samples were analyzed.

Table 2 - Summary of Analysis of Asbestos Bulk Samples

Sample No.	Room Number	Substrate	Sample Description	Result
S01A	**Collector**	**Duct**	**Black tar with Fibers**	**5% Chrysotile**
S01B	**Collector**	**Duct**	**Black tar with Fibers**	**Not Analyzed**
S01C	**Collector**	**Duct**	**Black tar with Fibers**	**Not Analyzed**
S02A	2253	Wall	Drywall Joint Compound	None Detected

Sample No.	Room Number	Substrate	Sample Description	Result
S02B	2253	Wall	Drywall Joint Compound	None Detected
S02C	2250	Wall	Drywall Joint Compound	None Detected
S03A	2253	Wall	Masonry Wall Mortar	None Detected
S03B	2253	Wall	Masonry Wall Mortar	None Detected
S03C	2253	Wall	Masonry Wall Mortar	None Detected
S04A	2250	Floor	VFT01 – Grey 12” x 12”, White flecks	None Detected
			Black Mastic	None Detected
S04B	2250	Floor	VFT01 – Grey 12” x 12”, White flecks	None Detected
			Black Mastic	None Detected
S04C	2250	Floor	VFT01 – Grey 12” x 12”, White flecks	None Detected
			Black Mastic	None Detected
S05A	**2266**	**Ceiling**	**AT01– 2’ x 4’, Large and Small Pinhole**	**Chrysotile 1%**
S05B	**2266**	**Ceiling**	**AT01– 2’ x 4’, Large and Small Pinhole**	**Not Analyzed**
S05C	**2266**	**Ceiling**	**AT01– 2’ x 4’, Large and Small Pinhole**	**Not Analyzed**
S06A	**2266**	**Floor**	**VFT02 – Grey 12” x 12”, White flecks**	**Chrysotile 3%**
			Black Mastic	None Detected
S06B	**2266**	**Floor**	**VFT02 – Grey 12” x 12”, White flecks**	**Not Analyzed**
			Black Mastic	None Detected
S06C	**2266**	**Floor**	**VFT02 – Grey 12” x 12”, White flecks**	**Not Analyzed**
			Black Mastic	None Detected

Asbestos-containing materials (ACM) identified within the Surveyed Areas at the time of the assessment are as follows:

- Pipe Insulation (Parging Cement Fittings and Pipe Straights);
- Tar insulation on Dust Collector duct; and
- 1’ x 1’ Acoustic Ceiling Tile; and
- Grey 9” x 9” Vinyl Floor Tiles.

Details are presented below under the headings of the most typical asbestos applications in buildings.

It should be noted that due to the presence of solid walls and ceilings (i.e. masonry block walls and above solid ceilings) throughout the survey area, access for viewing within the wall and ceiling cavities was not always possible. Suspect asbestos-containing materials may be present within wall and ceiling cavities that were not identified in this report but are suspected to be present. Caution should be taken when demolishing solid walls and ceilings within the areas being surveyed.

4.1.1 Sprayed Fireproofing

No sprayed fireproofing was identified within the surveyed area at the time of the assessment.

4.1.2 Thermal Mechanical Insulation (Friable)

Asbestos and non-asbestos mechanical insulations are present throughout the Survey Area. Mechanical insulations are applied to the following systems:

- Pipe Systems (including insulation on pipe fittings and pipe straights);
- Duct Systems; and
- Mechanical Equipment.

Piping Systems

Asbestos and non-asbestos piping systems were identified throughout the Surveyed Areas at the time of the assessment.

Pipe Straights

Layered corrugated paper insulation, known as “Aircell”, was observed in the areas surveyed on several of the domestic hot water piping, and heating supply pipes. Maple had previously sampled the material and was found to contain **70% Chrysotile asbestos** (Sample Set 16227 S02A). The material was observed to be generally in GOOD condition at the time of the assessment.

Layered paper and tar insulation, known as “Cellulose”, was observed in the areas surveyed on several of the cold-water piping, drains, and in some instances on condensate return piping. Maple had previously sampled the material and was found to be non-asbestos (Sample Set 16227 S03A).

All remaining straight sections of pipe insulation observed within the areas surveyed at the time of the assessment were either insulated with non-asbestos fibreglass and PVC or were un-insulated.

Pipe Fittings

Parging cement insulation on pipe fittings (which include elbows, valves, tees, hangers, etc.) was observed on pipe systems throughout the Surveyed Areas. The material was previously sampled by Maple and was found to contain **70% Chrysotile asbestos** (Sample Set 16227-S-01).

The insulation material was observed to be generally in GOOD condition.

All remaining pipe fittings observed are either not insulated or are insulated with non-asbestos horse hair, fibreglass, foam or PVC which are not suspected to contain asbestos.

Duct Systems

The fiberglass insulation present on the duct suppling the Dust Collector outside the Welding Shop (Room 2256) was covered with an asbestos-containing tar-impregnated coating. The body of the Dust Collector was observed to be uninsulated.

Three (3) representative samples (Sample Set 20771 S-01A) of the tar insulation were collected and analyzed for determination of asbestos content. Analysis of Sample Set 20771 S-01 found that the samples contain **5% Chrysotile Asbestos**. Remaining samples of the set were not analyzed due to the "Stop Positive Analytical Protocol" and therefore all of the tar material are considered to be asbestos-containing.

There was approximately fifty (50) square feet of this material observed to be generally in GOOD condition with approximately ten (10) square feet of the material in POOR condition at the time of the assessment.

Remaining duct systems observed within the surveyed area were either not insulated or are insulated with fibreglass which is not suspected to contain asbestos.

Mechanical Equipment

All mechanical equipment were observed within the surveyed area were either not insulated or are insulated with fibreglass which is not suspected to contain asbestos.

4.1.3 Texture Coat Finishes (Friable)

No texture coat finishes were identified within the surveyed areas at the time of the assessment.

4.1.4 Acoustic Ceiling Tiles (Potentially Friable)

Asbestos and non-asbestos acoustic ceiling tile systems were identified within the surveyed areas at the time of the assessment.

Three (3) visually distinct types of ceiling tile systems were observed in the surveyed areas.

A brief description of each type of ceiling tile is outlined below:

- AT-01 (2'x4' Small Pinhole and Fissure Pattern):

  AT-01 was observed to be present in Weight Room (Room 2253).

  No bulk samples of AT-02 were collected as a date stamp manufacture code (01/16/10) was present on the backside of the tile indicating that the tiles were recently manufactured and therefore not suspected to contain asbestos.

- AT-02 (2'x4' Spiral Pinhole and Fissure Pattern):

  AT-02 was observed to be present in the Dark Room (Room 2249), Control Room (Room 2258A), and the Work Room (Room 2266).

  No bulk samples of AT-02 were collected as a date stamp manufacture code (10/20/06) was present on the backside of the tile indicating that the tiles were recently manufactured and therefore not suspected to contain asbestos.

- **AT-03 (1'x1' Large Pinhole Pattern):**

  AT-03 was observed to be present in Tech Room (Room 2266) as a second ceiling.

  Three (3) representative samples (Sample Set 20771 S-05A-C) of AT-03 were collected and analyzed for determination of asbestos content. Analysis of Sample Set S-05A found that the samples contain **1% Amosite Asbestos**. Remaining samples of the set were not analyzed due to the "Stop Positive Analytical Protocol" and therefore all ceiling tiles of this pattern are considered to be asbestos-containing. The material was observed to be generally in GOOD condition at the time of the assessment

4.1.5 Vinyl Sheet Flooring (Potentially Friable)

No vinyl sheet flooring finishes were identified within the surveyed areas at the time of the assessment.

4.1.6 Vinyl Floor Tile (Non-Friable)

No asbestos-containing vinyl floor tiles were identified within the surveyed area at the time of the assessment.

Two (2) visually distinct pattern of vinyl floor tiles were observed within the Surveyed Areas at the time of the assessment. A brief description is outlined below:

- VFT-01 (Blue 12"x12" with White and Grey Flecks)

  VFT-01 was observed in the classroom (Room 2250).

  Three (3) representative samples (Sample Set S-02) of VFT-01 were collected and analyzed for determination of asbestos content. Analysis of Sample Set S-02 found that the samples do not contain asbestos. The black floor mastic associated with the tile was also analyzed as part of the sample set and was found not to contain asbestos.

- **VFT-02 (Grey 9"x9" with White and Grey Flecks)**

  VFT-02 was observed in the Work Room (Room 2266).

  Three (3) representative samples (Sample Set 20771 S-06) of VFT-02 were collected and analyzed for determination of asbestos content. Analysis of Sample Set S-02 found that the VFT02 contained **3% Chrysotile asbestos**.

The black floor mastic associated with the VFT02 was also analyzed as part of the sample set and was found not to contain asbestos.

VFT02 was observed to be in GOOD condition.

4.1.7 Asbestos Cement Products "Transite" (Non-Friable)

No asbestos-containing cement products were identified in the surveyed areas at the time of the assessment.

4.1.8 Drywall Joint Compound (DJC) (Potentially Friable)

No asbestos-containing drywall joint compound finishes were identified within the surveyed area at the time of the assessment.

Interior drywall finishes were present in the form of wall finishes between rooms 2253 and 2250 that may be disturbed.

Three (3) representative samples (Sample Set S-02A-C) of drywall joint compound were collected and analyzed for determination of asbestos content. Analysis of Sample Set S-02 found that samples did not contain asbestos.

4.1.9 Plaster (Potentially Friable)

No plaster finishes were identified within the Surveyed Areas at the time of the assessment.

4.1.10 Vermiculite (Friable)

No vermiculite insulation was observed to be present within the surveyed area at the time of the assessment. It should be noted that loose fill vermiculite insulation can often be present within voids of masonry and possibly some pre-manufactured surveyed area components that would not be identified during the course of this assessment.

4.1.11 Other

Masonry Block Mortar

No asbestos-containing mortar finishes were identified within the surveyed area at the time of the assessment.

Interior wall finishes present between rooms 2253 and 2250 that may be disturbed contained a masonry block wall with the upper section of drywall.

Three (3) representative samples (Sample Set S-03A-C) of mortar finish were collected and analyzed for determination of asbestos content. Analysis of Sample Set S-03 found that samples did not contain asbestos was detected in Sample S01B.

4.2 Lead

Four (4) bulk paint samples were collected for determination of lead content and submitted to EMSL Canada for analysis during the assessment. The sample number refers to the Certificate of Analysis Report presented as Appendix II and summarised in Table 3 below.

Table 3 - Summary of Analysis of Lead-in-Paint Samples

Sample No.	Locations	Sample Description	Result (%)
LBP1	**Dust Collector**	**Brown Paint on Metal Casing**	**0.32**
LBP2	Welding Shop (2256)	White Paint on Masonry Wall	0.062
LBP3	Weight Room (2253)	Green Paint on Masonry Wall	0.042
LBP4	Work Room (2266)	Blue Paint on Masonry Wall	0.057

No regulations currently exist in Ontario defining the lower limit of lead-containing material. The Ontario Ministry of Labour (MOL) has issued a guideline for lead abatement, entitled "*Guideline – Lead on Construction Projects*" (2004) which is considered enforceable. The Guideline does not specify what constitutes a material as "lead-containing". Instead, it outlines procedures based on the concentration of airborne lead encountered during removal, as well as provides procedures and/or specific operations for lead-containing material removal.

However, the Environmental Abatement Council of Canada (EACC) "*Lead Guideline for Construction, Renovation, Maintenance or Repair*" document classifies paint as either "Low-Level", "Lead-Containing", or "Lead-Based" as outlined in Table 4 below.

TABLE 4 - EACC Classification of Lead Paint

Concentration of Lead (%)	Definition
0.1 or less	"Low-Level Lead" (Virtually Safe)
Greater than 0.1 but less than 0.5	"Lead-Containing"
0.5 or greater	"Lead-Based"

Based on these criteria and the results of the sample analysis, the brown painted surface sampled on the Dust Collector is considered to be "Lead-Containing" and the white, blue and green painted finishes on the walls are considered to be "Low-Level Lead" (virtually safe).

4.3 Mercury

Mercury vapour is present in all fluorescent light tubes. Liquid mercury is also present in thermostatic switches located within the surveyed area.

4.4 Silica

Free crystalline silica, present as common construction sand, is present in all concrete and masonry products where present in the Select areas surveyed.

4.5 Isocyanates

Free isocyanate compounds would not be expected to be found in a non-manufacturing facility.

4.6 Vinyl Chloride Monomer

Vinyl chloride monomer would not be expected to be found in a non-manufacturing facility.

4.7 Benzene

Benzene would not be expected to be found in a non-manufacturing facility.

4.8 Acrylonitrile

Acrylonitrile would not be expected to be found in a non-manufacturing facility.

4.9 Coke Oven Emissions

Coke oven emissions would not be expected to be found in a non-manufacturing facility.

4.10 Arsenic

Arsenic would not be expected to be found in a non-manufacturing facility.

4.11 Ethylene Oxide

Ethylene oxide would not be expected to be found in a non-manufacturing facility.

4.12 Mould

No visible mould or water-damaged material was observed in the surveyed areas at the time of the assessment.

There was visible water-staining present on several ceiling tiles within the following surveyed areas:

- Dark Room (Room 2249) – Two (2) tiles;
- Weight Room (Room 2253) – Four (4) tiles;
- Control Room (Room 2258A) – Two (2) tiles; and
- Work Room (Room 2266) – Two (2) tiles.

It is possible that mould growth is present in concealed areas such as wall or ceiling cavities, pipe chases, etc. or in areas not currently assessed by Maple. The client should notify Maple should any water damage or suspect mould growth be discovered.

4.13 Polychlorinated Biphenyls (PCBs)

The fluorescent lamp fixtures observed present in the surveyed areas contained T8 fluorescent light tubes. T8 fixtures have electronic ballast and are considered as not containing PCB.

5.0 RECOMMENDATIONS

5.1 Asbestos

Asbestos-containing materials (ACM) identified within the Surveyed Areas at the time of the assessment are as follows:

- Pipe Insulation (Parging Cement Fittings and Pipe Straights);
- Tar insulation on Dust Collector; and
- 1’ x 1’ Acoustic Ceiling Tile; and
- Grey 9” x 9” Vinyl Floor Tiles.

General recommendations for each of the confirmed asbestos-containing and suspect asbestos-containing materials are as follows.

- Removal or disturbance of ACM mechanical insulations requires the use of Type 2, Type 3 or Glove Bag Asbestos Abatement Procedures as appropriate for the work being performed.
- Removal or disturbance of ACM tar materials requires the use of Type 1 Asbestos Abatement Procedures (provided no power tools are used and the material is wetted). If power tools are required Type 3 Asbestos Abatement Procedures must be applied.
- Removal or disturbance of ACM acoustic ceiling tiles less than 7.5m^2 requires the use of Type 1 Asbestos Abatement Procedures; greater than 7.5m^2 requires Type 2 Asbestos Abatement Procedures.
- Removal or disturbance of ACM vinyl floor tiles requires the use of Type 1 Asbestos Abatement Procedures (provided no power tools are used and the material is wetted). If power tools are required Type 3 Asbestos Abatement Procedures must be applied.

It is important to note that due to the presence of solid wall and ceiling systems, the assessment was not able to confirm or deny the presence of ACM within wall and ceiling cavities. The presence of concealed ACM should be assumed as well as within rooms that were not accessible during the assessment. It is possible that ACM is present that was not identified in this report.

5.2 Lead

The brown paint finish on the Dust Collector is “Lead-Containing” and should follow appropriate procedures if disturbed or removed.

Disturbance of paints that are considered "Lead-Containing" should be completed using Lead Abatement Procedures as appropriate in accordance with EACC and Ministry of Labour Guidelines. These Lead Abatement Procedures are generally as follows:

- Class 1 Lead Abatement Procedures (removing paint by means of chemical stripper or heat gun, removal of lead sheeting);
- Class 2A Lead Abatement Procedures (removal of lead paint using power tools equipped with HEPA vacuum attachment, removal by scraping or sanding using non-powered hand tools, or manual demolition of plaster finishes);
- Class 3A Lead Abatement Procedures (removal using power tools, welding or torching; and
- Class 3B Lead Abatement Procedures (for abrasive blasting).

The remaining paint finishes sampled from the various wall finishes were found to be "Low-Level Lead" (0.1% or less) and considered virtually safe provided that:

- airborne lead concentrations are kept below 0.05 mg/m^3;
- general dust suppression and worker hygiene procedures are utilized; and
- torching or other activities that create fumes are not completed.

5.3 Mercury

Mercury vapour is present in all fluorescent light tubes. All fluorescent light tubes should be handled and disposed of appropriately.

5.4 Silica

Proper dust suppression techniques and other safety precautions to control possible generation of silica dust from the demolition of concrete and masonry products present in the building should follow those outlined in the Ministry of Labour Guideline- Silica on Construction Projects, 2004.

5.5 Mould

Using Level 1 Mould Remediation Procedures in accordance with EACC Guidelines, consider the removal and replacement of the water-stained ceiling tiles present in the surveyed areas.

6.0 LIMITATIONS

Due to the nature of building construction some limitations exist as to the possible thoroughness of the subject investigation. The field observations are considered sufficient in detail and scope to form a reasonable basis for the findings presented in this report. Maple warrants that the findings and conclusions contained herein have been made in accordance with generally accepted evaluation methods in the industry and applicable regulations at the time of the performance of the assessment.

It is possible that conditions may exist which could not be reasonably identified within the scope of the investigation or which were not apparent during the site investigation. Maple believes that the information collected during the investigation period concerning the property is reliable. No other warranties are implied or expressed.

Information provided by Maple is intended for Client use ONLY. Any use by a third party, of reports or documents authored by Maple, or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Maple accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted.

The liability of Maple or its staff will be limited to the lesser of the fees paid or actual damages incurred by the Client. Maple will not be responsible for any consequential or indirect damages. Maple will only be liable for damages resulting from negligence of Maple; all claims by the Client shall be deemed relinquished if not made within two years after last date of services provided.

Please contact Maple Environmental Inc. at (905) 257-4408 for inquiries regarding this project.

MAPLE ENVIRONMENTAL INC.
Environment, Health and Safety Consultants

Prepared By:

Richards Reboks
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Senior Project Manager

APPENDIX I

LABORATORY ANALYSIS REPORT – ASBESTOS

emcscientific
INCORPORATED

Laboratory Analysis Report

To:

Richards Reboks
Maple Environmental Inc.
482 South Service Road East, Suite 116
Oakville, Ontario
L6J 2X6

EMC LAB REPORT NUMBER: A88037
Job/Project Name: DDSB, MCUI, SHOPS
Analysis Method: Polarized Light Microscopy – EPA 600
Date Received: Feb 6/23 **Date Analyzed:** Feb 13/23
Analyst: Chengming Li
Reviewed By: Malgorzata Sybydlo

Job No: 20771
Number of Samples: 18
Date Reported: Feb 13/23

Client's Sample ID	Lab Sample No.	Description/Location	Sample Appearance	SAMPLE COMPONENTS (%)			
				Asbestos Fibres		Non-asbestos Fibres	Non-fibrous Material
S01A	A88037-1	Tar wrap on hopper duct	Black, tar with fibres	**Chrysotile**	**5**	25	70
S01B	A88037-2	Tar wrap on hopper duct	NA	**NA**			
S01C	A88037-3	Tar wrap on hopper duct	NA	**NA**			
S02A	A88037-4	DJC – wall in 2253	White, joint compound	**ND**			100
S02B	A88037-5	DJC – wall in 2253	White, joint compound	**ND**			100
S02C	A88037-6	DJC – wall in 2250	White, joint compound	**ND**			100
S03A	A88037-7	Mortar – masonry wall in Rm 2203	Grey, cementitious material	**ND**			100
S03B	A88037-8	Mortar – masonry wall in Rm 2203	Grey, cementitious material	**ND**			100
S03C	A88037-9	Mortar – masonry wall in Rm 2203	Grey, cementitious material	**ND**			100
S04A	A88037-10	VF701 – blue 12"x12" VFT, Rm 2250	2 Phases: a) Blue, vinyl floor tile b) Black, mastic	 **ND** **ND**			 100 100
S04B	A88037-11	VF701 – blue 12"x12" VFT, Rm 2250	2 Phases: a) Blue, vinyl floor tile b) Black, mastic	 **ND** **ND**			 100 100
S04C	A88037-12	VF701 – blue 12"x12" VFT, Rm 2250	2 Phases: a) Blue, vinyl floor tile	 **ND**			 100

EMC LAB REPORT NUMBER: A88037
Client's Job/Project Name/No.: 20771
Analyst: Chengming Li

Client's Sample ID	Lab Sample No.	Description/Location	Sample Appearance	SAMPLE COMPONENTS (%)			
				Asbestos Fibres		Non-asbestos Fibres	Non-fibrous Material
			b) Black, mastic	**ND**			100
S05A	A88037-13	A703 – 1'x1' tile – Rm 2266	Grey, ceiling tile	**Amosite**	**1**	75	24
S05B	A88037-14	A703 – 1'x1' tile – Rm 2266	NA	**NA**			
S05C	A88037-15	A703 – 1'x1' tile – Rm 2266	NA	**NA**			
S06A	A88037-16	VF702 – grey 9"x9", Rm 2266	2 Phases: a) Grey, vinyl floor tile b) Black, mastic	 **Chrysotile** **ND**	 **3**		 97 100
S06B	A88037-17	VF702 – grey 9"x9", Rm 2266	2 Phases: a) NA b) Black, mastic	 **NA** **ND**			 100
S06C	A88037-18	VF702 – grey 9"x9", Rm 2266	2 Phases: a) NA b) Black, mastic	 **NA** **ND**			 100

Note:
1. Bulk samples are analyzed using Polarized Light Microscopy (PLM) and dispersion staining techniques. The analytical procedures are in accordance with EPA 600/R-93/116 method.
2. The results are only related to the samples analyzed. **ND** = None Detected (no asbestos fibres were observed), **NA** = Not Analyzed (analysis stopped due to a previous positive result).
3. This report may not be reproduced, except in full without the written approval of EMC Scientific Inc. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.
4. The Ontario Regulatory Threshold for asbestos is 0.5%. The limit of quantification (LOQ) is 0.5%.
5. Vinyl floor tiles may contain very fine asbestos fibres which the PLM method cannot detect. TEM analysis may be necessary to confirm the absence of asbestos.

APPENDIX II

LABORATORY ANALYSIS REPORT – LEAD

EMSL Canada Inc.
2756 Slough Street, Mississauga, ON L4T 1G3
Phone/Fax: (289) 997-4602 / (289) 997-4607
http://www.EMSL.com torontolab@emsl.com

EMSL Canada Or	552301667
CustomerID:	55MAPL78
CustomerPO:	20771
ProjectID:	

Attn: **Richard Reboks**
Maple Environmental, Inc.
482 South Service Road East
Suite 116
Oakville, ON L6J 2X6

Phone:	(905) 257-4408
Fax:	(905) 257-8865
Received:	2/6/2023 09:00 AM
Collected:	1/31/2023

Project: **20771 DDSB, MCVI DSUB**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

Client SampleDescription	*Collected*	*Analyzed*	*Weight*	*RDL*	*Lead Concentration*
LBP1	1/31/2023	2/6/2023	0.2444 g	0.0082 % wt	0.32 % wt
552301667-0001	Site: 2256 - Brown Paint on Hopper				
LBP2	1/31/2023	2/6/2023	0.2500 g	0.0080 % wt	0.062 % wt
552301667-0002	Site: 2256 - Off-White Masonry				
LBP3	1/31/2023	2/6/2023	0.2508 g	0.0080 % wt	0.042 % wt
552301667-0003	Site: 2253 - Green Paint on Masonry				
LBP4	1/31/2023	2/6/2023	0.2520 g	0.0080 % wt	0.057 % wt
552301667-0004	Site: 2266 - Blue Paint on Wall				

Rowena Fanto, Lead Supervisor
or other approved signatory

* Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.008% wt based on the minimum sample weight per our SOP. "<" (less than) result signifies the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. Definitions of modifications are available upon request.
Samples analyzed by EMSL Canada Inc. Mississauga, ON AIHA LAP, LLC-ELLAP Accredited #196142

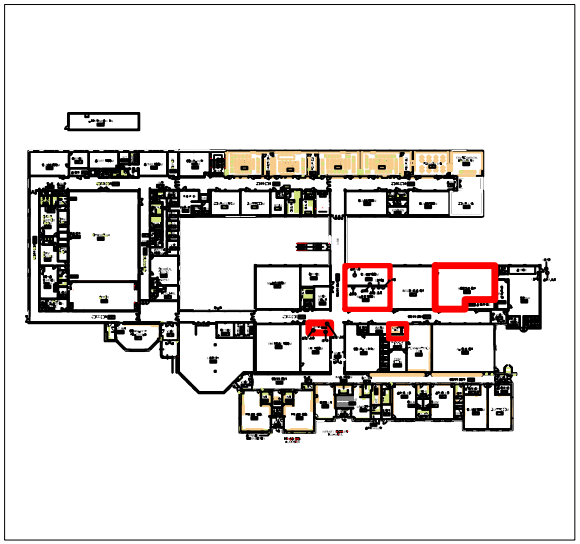
Initial report from 02/13/2023 08:10:00

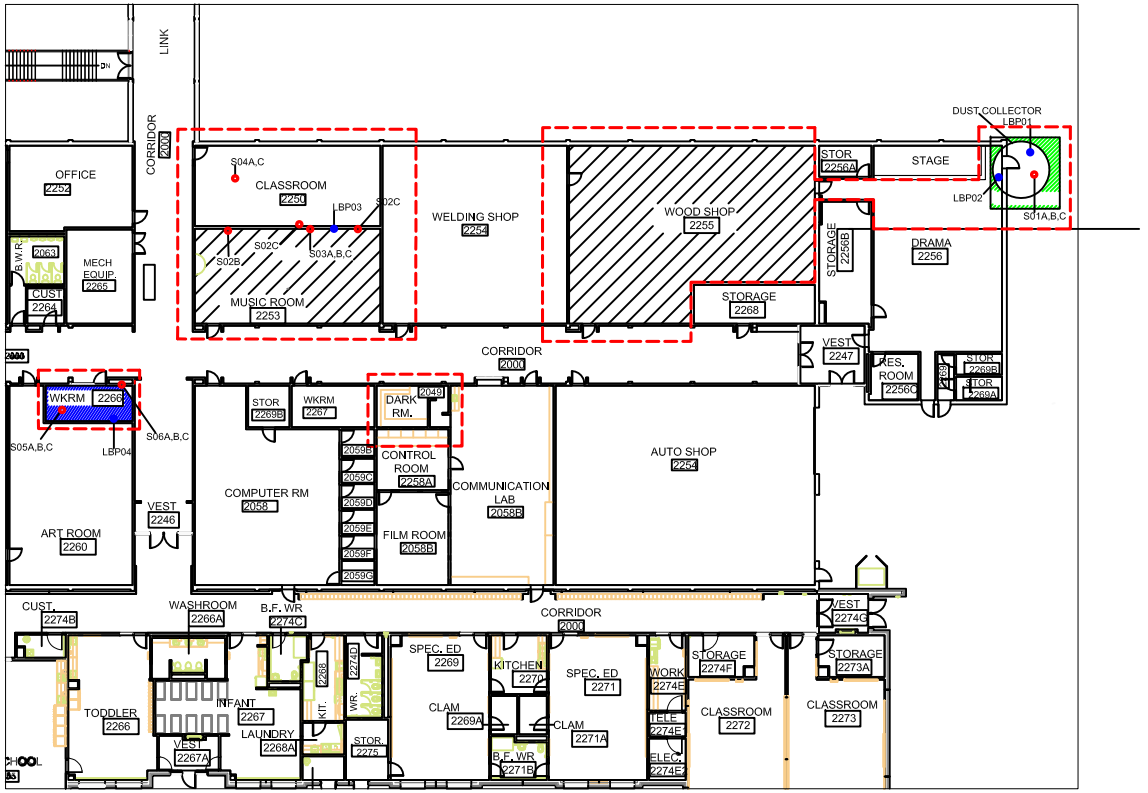
APPENDIX III

DRAWINGS

Note:

1. "Lead Containing" Paint present on exterior of Dust Collector.
2. 1'x1' acoustic ceiling tiles present above lay-in tiles in Room 2266 are Asbestos-containing.
3. Water-Stained lay-in acoustic ceiling tiles present in various locations.





MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

482 South Service Rd. E. - Suite 116
Oakville - Ontario - L6J-2X6
Tel: (905) 257 4408 - Fax: (905) 257 8865

www.MapleEnvironmental.com

PROJECT NO.: 20771

Drawn By: Y.Shah

Checked By: R.Reboks

Legends

SYMBOL	DESCRIPTION
	ASBESTOS BULK SAMPLE: S-##
	LEAD BULK SAMPLE: LBP-##
	SURVEY AREA
	VINYL FLOOR TILES AND ACOUSTIC CEILING TILES
	MECHANICAL INSULATION
	INSULATION OF DUST COLLECTOR SURVEY AREA

CONFIRMED ACM

SYMBOL	DESCRIPTION
NOTE	ACOUSTIC CEILING TILES

Limited Designated Substance Survey

DDSB

R.S. McLaughlin CVI
570 Stevenson Road N,
Oshawa, Ontario
First Floor Plan

SCALE: NTS

SHEET: DS-01

February 27, 2023

SPECIFICATIONS

1. GENERAL

1.1 DESCRIPTION

1.1.1 Comply with Section 01005 "General Requirements".

1.1.2 Work includes demolition and removal to the full extent required by the drawings and as required to install new materials and equipment in preparation for the proposed work in the areas to be altered. Including but not limited to; all site clearing, stripping and removal of existing surfaces and structures, as shown on drawings and as required permitting installation of new work by other trades, and the removal of rubble and debris from the site for disposal.

1.1.3 The Contractor shall ensure that a thorough check of possible hazards, (asbestos contamination, excessive dust, electrical cables, etc.) is done prior to removal of existing constructions. If hazards are encountered, the Contractor must notify the Board in writing, prior to proceeding with Work. The Board will direct the process for remedial action.

Asbestos and other hazardous materials encountered during demolition shall be removed using procedures as detailed in Ontario Regulation 654/85, under the Occupational Health and Safety Act, regulating Asbestos on Construction Projects.

1.1.4 Cutting of new and existing work to accommodate Mechanical and Electrical work, unless otherwise noted, will be executed by the Mechanical and Electrical trades. Patching will be carried out by General Contractor.

1.2 SCOPE OF WORK

1.2.1 The work of this Section is for the demolition, removal and repair of all items required by the work, including:

a) Demolition and complete removal of existing areas to be renovated to the extent indicated, including all obsolete foundations as indicated on structural drawings, all obsolete finishes and fittings, tack-boards, chalkboards including obsolete miscellaneous equipment and services. All exit corridors to remain functional throughout the demolition.
b) Demolition, renovation and restoration of surrounding site. Access to the site and to all areas of the school property must be maintained per Board requirements and / or Authorities Having Jurisdiction.
c) Demolition shall be carried out in an orderly and careful manner. The debris and refuse of demolition shall be removed from the building and from the site promptly and at frequent intervals and shall not be allowed to accumulate.
d) Unless noted otherwise, building materials resulting from demolition shall become the property of the Contractor, to be removed from the site promptly by the Contractor.
e) Demolition and removal work shall include all exterior walkways, paving, landscaping, fencing and curbs which require removal and / or relocation to suit the new Work.
f) Remove existing windows, doors, frames and walls in existing building where indicated.
g) Remove, replace and / or relocate all HVAC equipment, lighting fixtures, plumbing and all other items required for the new Work and as indicated throughout the specifications and on the Contract Drawings.
h) Removal of existing ACT and existing ceiling as required for mechanical, electrical and structural work within the existing building including hazardous material removal and all misc. connections: the Contractor will carefully remove existing ceilings within the existing school areas for installation / connection of the new services. The Contractor shall protect the existing grid in place (or remove and reinstate as required) and repair any damaged areas to new condition

throughout within the Base Contract. Non-damaged tiles will be stockpiled in a clean, dry, safe manner for reinstatement within the existing areas of the school. Tiles of different pattern nor new tiles will be mixed in with existing tiles in any one room. Damaged tiles (scored, marked, uneven edges, etc.) will not be reinstated and shall be replaced. The Contractor shall be entitled to a maximum extra of 15% of the total reinstated area for replacement tiles from the specified cash allowance. Replacement of damaged tiles above and beyond the 15% will be the responsibility of the Contractor unless they can document that such damage occurred prior to the Contractors handling of the ACT. All work to modify existing or new replacement ACT tiles and grid to suit new conditions / services shall be included in the Base Contract.

1.2.2 **Owners Preparations**:

a) Board will savage items at their discretion for use on other areas of the school.
The Board will remove all furniture and contents of cupboards to be retained, prior to start of demolition. Furniture will be moved out once at start of Contract and moved in once at the conclusion of the Contract. Any other moving required by the Contractors failure to meet schedule or other deficiencies – the full cost will be charged to the Contractor.

1.2.3 Contractors Preparations:

a) Demolition work shall not proceed until precautions have been taken to keep the structure weather tight and/or dustproof screens have been erected to protect adjoining areas. Provide suitable barricades and warning signs. Provide sealed dust-proof barriers for all air-handling ductwork entering the place of Work and other openings that could communicate dust from the work place to the adjoining school areas.
b) Support all loads while demolishing and until new load bearing material is in situ.
c) Demolition of existing floors, ceilings, partitions, or other construction shall include the relocation of existing mechanical and electrical services wherever shown on drawings and/or identifiable at the site.
d) Removal of all existing floor finishes, including underlay to original sub-floor at locations where new floor finish is called for, ready for application of new finishes.
Where exiting flooring is schedule to be removed for re-installation, all surfaces have to be cleaned, all adhesive removed and prepare for the re-installation.
e) Remove abandoned services such as conduits, pipes, wiring, ducts, fixtures, equipment, etc., where required for the work or indicated on the drawings.
f) Removal of existing electrical items including fixtures, etc., where required for the work or indicated on the drawings and not required to be relocated within the School premises.
g) Removal of all mechanical items including plumbing fixtures, services, etc., where required for the work or indicated on drawings and/or where not required to be relocated within the School premises.
h) Removal of existing millwork and making good, where necessary.
i) Removal shall mean removal from site and safe disposal in a legal manner.
j) Making good of existing materials to provide smooth, dust and grease-free surfaces, ready for the installation of required finishes.
k) Existing construction, equipment, and finishes which are to remain shall be protected. Otherwise make good.
l) Contractor shall review with Consultant which materials removed during the demolition shall be handed over to the Owner. They shall be removed from the site to a storage location within the school, if directed by the Owner.
m) Carefully clean and store all materials and equipment to be reused.
n) Maintain the existing building secure at all times and provide temporary secure closures as required.
o) The work of demolition or service shutdowns which could affect the operation of the school program, shall be undertaken outside school hours and with prior approval of Board and school officials only.

1.2.4 Demolition as follows:

i) Cut new openings in existing concrete and masonry walls.
ii) Remove existing concrete floors.
iii) 1. For the work of items i), ii), and iii), use wet concrete or masonry saws and carry work to a neat clean junction with constructions which area to remain.
2. Concrete slabs on grades shall be cut to half depth only and broken out with pneumatic hammers to avoid cutting under floor services and provide a key for the replacement slab. Failure to comply with this requirement makes the Contractor responsible for under floor services.
iv) Remove portions of existing roof construction including cants, flashing, and structure for joining new roof. Patch and seal as required ensuring water tightness. Maintain warranty on existing roof .
v) Remove ceiling acoustic boards, arrange for safe storage and reinstall in the finished work only where called for on the drawings, otherwise provide new tiles to all renovated areas.
vi) Remove and / or modify existing windows, doors and screens, complete in preparation for alterations..
vii) Remove existing floor finishes in preparation for new flooring.
ix) Remove existing partitions, doors and frames, as indicated on drawings.
x) Remove existing millwork, fixtures and fittings as required for new work.
xi) Removal, recapping, and diverting of mechanical and electrical services as required.
xii) All cutting or grinding shall be done by safe "wet" means. No dust shall be made airborne by grinding or cutting.
xii) Co-ordinate with mechanical and electrical trades for cutting and patching.
xiii) Removal of all existing cabinets, chalkboards, tack-boards where required for new work.
xiv) Removal of all metal shelving, cabinets, where required for new work - hand over to Owner.

1.2.5 Repair work to include:

i) Included in the General Work are miscellaneous items and work required to complete the alterations as detailed; i.e. rough and finished carpentry, structural steel, miscellaneous metal, concrete work and mechanical-electrical work.

All

ii) Provide miscellaneous lintels for installation under Division 4.
iii) Provide caulking required to close between various finishes as required. Caulking to be acrylic grey coloured sealant "Mono" or equal.
iv) Provide rough and finished carpentry required by the drawings.
v) Provide and install access doors required by the drawings.
vi) Provide and install new finishes as required by the drawings and schedule.
vii) Provide and install pre-finished metal angles to close between lockers and masonry.
viii) Disconnect and reinstall mechanical and electrical items as required.

1.2.6 Exterior Work: The Contractor shall include in the tender all miscellaneous work exterior to the building indicated on the drawings and/or identifiable at the site required to complete the full scope of the Contract Work.

1.2.7 Mechanical and Electrical Equipment: Further specified in Division 15 Mechanical and Division 16 Electrical.

a) Mechanical and Electrical Contractors shall make safe all services, identify equipment to be retained, re-used or handed over to the Owner. Contractor to do demolition and disposal unless otherwise specified.
b) Contractor shall maintain all services required for continuing use of the school and property.
c) Patching and repair of any openings in exposed or finished surfaces shall be by the trade responsible for the finish surface under the coordination of the Contractor. The Contractor shall coordinate all cutting, openings and patch and repair to minimize interference between trades and

existing services. Note required fire stopping to maintain existing required fire separations and fire separations indicated within the new Work.

d) Removal of partitions and doors and installation of new partitions and making of new openings for doors, etc., will require the relocation of mechanical and electrical equipment and outlets. The Contractor shall be responsible to obtain complete information on such alterations and services and equipment required for relocation prior to tendering and all such Work shall be included in the Contract.
e) Contractor shall be responsible for removing redundant equipment, electrical and otherwise unless specifically noted elsewhere.

1.2.8 Making Good Finishes and Joining of Existing and New Work.

a) Floors of altered areas must be finished flush and ready for final finish applications with adjacent existing finishes to remain.
b) Where floor slab is required to be cored / drilled for new services, care must be taken to install new openings clear of structural members and existing services to remain. After installation of new services, all openings must be made watertight.
c) Where existing floor to be cut for new services, remove existing vinyl floor tile and supply and install new vinyl tile as per finish schedule / existing condition. Patching shall not be evident.
d) At existing openings in concrete block walls shown to be blocked up, masonry shall be keyed in with units identical to existing adjacent units, so that coursing and bond are continuous. Blocks to match adjacent in size, shape and pattern. Salvaged blocks free of defects and or mortar may be used to infill existing openings only at the approval of the Architect. Similarly for existing brick walls requiring patching. Do not use any salvaged materials in the construction of the new openings.
e) Where new openings are shown to be cut into existing walls, Contractor shall break open the wall to size required, provide new steel angle or lintel block over the opening (as specified) and patch all adjacent materials.
f) Where openings are blocked up in existing painted walls, where new openings are made, or where millwork or equipment are removed from walls; surface shall be completely repainted to the next “inside” perpendicular corner per Section 09900. All other walls of the same colour in the same room as patched wall shall be painted with one finish coat of paint. No patch painting will be permitted.
g) All new horizontal runs of ducts, pipes and conduits shall be concealed in ceiling spaces, unless specifically noted otherwise.
h) All new duct drops and risers shall be concealed in ceiling spaces, bulkheads or furrout duct shafts. All new pipe and conduit drops and risers shall be furred out or buried in walls as indicated. New devices on walls shall be recessed and new devices on existing walls shall be surface mounted. Exposed conduit and wiremould shall be painted in with existing wall colour.
i) All existing ceiling components and ceiling mounted equipment shall be carefully removed where required.
j) Existing extra ceiling tiles which are removed shall be turned over to Board staff for re-use depending on condition.
k) Existing concrete and painted concrete floors shall be prepared according to manufacturers' instructions for new adhesive applied finishes or new paint finish per Room Finish Schedule.
l) Special care must be taken not to damage existing roof. Any damage must be repaired as recommended and approved by the Consultant.
m) Cutting, patching and flashing of the roof must be done in conformity with existing construction and adjacent surfaces. Integrity of the existing and new roofs must not be compromised.
n) Cuts through the existing steel deck must be reinforced. Provide stamped engineered shop drawings, showing locations and sizes of cuts and all reinforcement.
o) Provide roof curbs at roof mounted mechanical equipment and install roofing, flashing and counter-flashing to ensure weather tight seal.

1.3 **SITE EXAMINATION**

1.3.1 Verify all site conditions, which affect the work of this Section, and immediately report, in writing, all discrepancies and conditions which are at variance with drawings and specifications and could adversely affect the performance of this Section. Failure to do the above will imply acceptance of all conditions by the Contractor.

1.3.2 Contractor is responsible to document by record photographs of the existing condition of the areas of the work and the areas adjacent to it prior to starting demolition and construction. Copy of record photographs to be submitted to Architect and Owner **PRIOR TO COMMENCEMENT OF THE WORK**. Failure to submit existing condition photographs shall require the Contractor accept responsibility for any and all damaged materials in and around the place of the Work and for the provisions required to make good all such damage.

1.3.3 Claims thereafter, on account of damages or extra costs resulting from such discrepancies will be rejected, unless they are the direct result from such conditions which could not be definitely ascertained before commencement of work.

1.3.4 Existing utility and service locations shown on drawings for information only. Verify on site all underground and above ground services, whether or not shown on drawings and be fully responsible for locating and staking of said services on the site by public utilities companies. Verify also with Owner's maintenance and operations department with respect to the Owner's service.

1.3.5 The Consultant does not assume any responsibility for the accuracy and completeness of the documentation of such services and where shown on drawings.

1.3.6 Various parts of the remaining mechanical and electrical equipment will require alterations, removal and / or replacement to suit the requirements of the new Work. It is the responsibility of each contractor to determine the full extent of such alterations before tendering.

1.4 **STANDARDS AND CODES**

1.4.1 In addition to complying with all applicable provincial and municipal codes and regulations, comply with the requirements of all insurance carriers providing coverage for this work.

1.4.2 The use of explosives will not be permitted.

1.4.3 To Ontario Fire Code, Part 8, Demolition, including not limited to:
a) Shutting off and capping services,
b) Management of combustible salvage, waste and rubbish,
c) Protection of persons and property,
d) Maintenance of fire firefighters access,
e) Provision of fire extinguishing equipment,
f) Maintenance of existing and/or temporary exits.

1.4.4 To CSA S350-M80 'Code of Practice for Safety in Demolition of Structures, the Ontario Occupational Health and Safety Act, and regulations of authorities having jurisdiction.

1.4.5 QUALITY ASSURANCE: Work of this section shall include protection measures, consisting of materials, constructions and methods, required by jurisdictional authorities to save persons and property from harm.

1.5 **PROTECTION**

1.5.1 Student and public safety and required exiting from the existing school must be maintained at all times.

1.5.2 Construction fence must be installed and construction area secured PRIOR to any Work undertaken at the Site. Enclosure must conform to Ministry of Labour and Municipal requirements in addition to provisions specified hereunder.

Construction gates to be manned and supervised for pedestrian access at walkways and play areas during school operation and as directed by school staff.

1.5.2 Take all necessary precautions to protect the existing building, remaining fitments and furniture, etc. and services from damage during demolition work. Accept responsibility for any damage which may occur and make good without cost to the Board. Determine location of services situated within, or adjacent to, the site before demolition work commences. Accept responsibility for damage to existing services and make good without cost to the Board.

1.5.3 Maintain fire protection and enforce proper fire prevention practices in accordance with the Board's requirements and Authorities Having Jurisdiction.

1.5.4 Be responsible for maintaining the existing building in a weather and watertight condition at all times until the completion and acceptance of the Work. All damage caused to the building interior and/or furnishings of the existing building by neglect of the Contractor or any of his forces shall be made good at his expense including all costs and charges which may be claimed by the Board for damages or inconvenience suffered. Protection shall be adequate to provide security.

1.5.5 Building is to be occupied during construction. Provide for heated enclosures at exterior as required. Open salamanders are not permitted.

1.5.6 Floors walls and other objects to be retained shall be repaired and made good from all damage / alteration by this Contract. Where existing openings are closed up and new openings are constructed make good all adjacent surfaces to new condition. Where existing classroom doors and frames are removed, provide new frames and doors and make good all surfaces.

1.5.7 Contractor is responsible to document by record photographs the existing condition of the area of the work and the areas adjacent to it prior to starting demolition and construction. Copy of record photographs to be submitted to Architect **PRIOR TO COMMENCEMENT OF WORK**.

1.5.8 Ensure that adjacent private and public properties, both within and without the premises, are protected from damage resulting from Work of this Section. Install protection consisting of fences, hoarding, braces, railings, warning signs, visual and audible signals, barricades, and substantial constructions providing physical protection. Property shall include but not be limited by, structures, and their finishes and appurtenances; site improvements; trees, planting and landscaping; furnishings, fixtures, hardware and equipment.

1.5.9 Prevent movement, settlement, or collapse of adjacent services, sidewalks, driveways, trees, building or building parts.

1.5.10 Protect existing services from damages. If necessary, relocate active services to ensure that they function continuously in safety and without risk of damage. Cap off and remove unused services encountered during demolition after approval is given by the utilities or Jurisdictional Authorities, whichever may apply, and the Consultant.

1.5.11 Protect existing items designated to remain and items designated for salvage. In the event of damage to such items, immediately replace or make repairs to approval of the Consultant and at no cost to the Owner.

1.5.12 Maintain security of areas in which demolition is proceeding by control of access through hoarding, enclosing fences, and barricades during times work is in progress, and by locking hardware otherwise.

1.5.13 Prevent spread of dust beyond the demolition area by wetting, or by other approved means, as it accumulates.

1.5.14 Keep sidewalks, streets, and highways free of dust and debris from demolition work. Clean up accumulations as they occur.

1.5.15 Remove protections and barricades only if and when directed.

1.5.16 Supply and installation of protection around existing trees and planting to remain in conformance with Authorities Having Jurisdiction. Immediately repair damage to trees, bench marks, structures, buried and above-ground services, and survey monuments should it occur as a result of this Section.

1.5.17 Be responsible for damages of any kind and making good to the Consultant's approval.

1.6 **DUST CONTROL**

1.6.1 Use all means necessary to prevent spread of dust during performance of the Work of this Section by dust control and temporary dust partitions. Thoroughly moisten all surfaces as required to prevent dust from being a nuisance to the public, neighbours and performance of other work on the site. Take precautions to avoid water damage during wetting down operations.

1.6.2 Dustproof partitions shall consist of construction grade wood 38 mm x 92 mm framing from floor to the underside of deck with one layer of 13 mm plywood sheathing covered with sealed and taped 10 mil polyethylene, caulked and sealed around the perimeter of the partition covered by two layers of 16 mm type X gypsum wall board with offset joints taped and filled with two coats of good quality paint - colour to Architects selection.

1.6.3 Dustproof partitions shall be erected outside of school operating hours and shall remain in place until the new addition is Substantially Complete and accepted by the Owner in writing.

1.6.4 Provide sealed dust-proof barriers for all air-handling ductwork entering the place of Work and other openings that could communicate dust from the work place to the adjoining school areas. Remove at the completion of all dust / odour producing Work, thoroughly clean adjacent duct-work etc. from all debris from construction and make good all finishes disturbed by the sealing procedures.

1.7 **TRAFFIC FLOW**

1.7.1 Conduct operations in such a manner as not to impede vehicular or pedestrian traffic normal to area adjacent to building or on streets, sidewalks or alleys given access to area or buildings in neighbourhood. Do not impede or create unsafe conditions for the surrounding public / play areas.

1.7.2 Do not place or store materials or equipment in such a way as to obstruct flow of traffic on thoroughfares, streets, sidewalks or space surrounding buildings.

2. **PRODUCTS**

2.1 **MATERIALS FROM DEMOLITION**

2.1.1 All materials from the demolition and preparatory work shall become the property of the Contractor and be removed from the site unless otherwise mentioned.

2.1.2 On–site burning will not be permitted.

2.1.3 Take over items for demolition and repairs in their condition on date that tender is accepted, irrespective of their condition prior to tendering.

2.1.4 Removal of hazardous substances, where required, shall be carried out in strict accordance with regulations of the authorities governing such substances.

2.1.5 Each trade, upon completion of work shall remove plant, equipment, surplus materials and debris resulting from the work. Any hazardous waste must be removed from the site and are not to be placed in the Owner's trash receptacle.

3. **EXECUTION**

3.1 **WORKMANSHIP**

3.1.1 **Do not start demolition without the approval of the Board**.

3.1.2 Before commencing demolition, have existing mechanical, electrical and other services in the areas being altered, cut off, capped at source, diverted, or removed as required. Protect and maintain services in the existing building without interruption during the periods when they are required for use. The capping or diverting of lines encountered within the area of alteration shall only be carried out within the time periods as directed by the Board's local representative.

3.1.3 Provide protection as required to enable existing building and equipment to remain in continuous and normal operation and maintain construction schedule.

3.1.4 Furnish all labour, materials, tools, plant and services necessary for or incidental to the work of this Section.

3.1.5 Retain and hand over to the Board's representative any items designated as the Board's property.

3.1.6 All repairs shall match existing quality.

3.1.7 Repairs to sidewalks, curbs, roads, etc. shall be to municipal standards.

3.1.8 All existing openings in concrete slabs which become unnecessary due to abandoned services shall be filled with concrete. Concrete repairs shall be neat and flush with exposed surfaces. Roughen sides of openings to provide keying for new concrete.

3.2 **PREPARATION**

3.2.1 Inspect the site with the Consultant and Board representative and verify the extent and location of items designated for removal, disposal, salvage and items to remain.

3.2.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

3.2.3 Notify and obtain approval of utility companies before starting demolition.

3.3 **DEMOLITION**

3.3.1 Be responsible to obtain permission to enter, before starting work.

3.3.2 Do not use explosives or smashing type of mechanical wrecking devices without Consultants written approval.

3.3.3 The limits of demolition, and areas and phases of work, where shown on drawings, are approximate only, and shall be confirmed to the Consultant's approval.

3.3.4 Carry out demolition in a systematic manner as necessary to accommodate remedial, reconstruction or new work.

3.3.5 Remove items as indicated. Do not disturb items designated to remain in place. Repair and make good items damaged / disrupted by this Work scheduled to remain in place.

3.3.6 Remove existing concrete sidewalk and lines, curbs, asphalt, patios, walls, structures, etc. where shown on drawings and where existing work conflicts with new work.

3.3.7 In removal of pavements, curbs and gutters:
a) Square up adjacent surfaces to remain in place by saw cutting or other method approved by Consultant.
b) Protect adjacent joints and load transfer devices.
c) Protect underlying and adjacent granular materials.

3.3.8 Use equipment and methods of removal and hauling which do not tear, gouge, break, or otherwise damage or disturb pavement to remain.

3.3.9 When removing pipes under existing or future pavement area, excavate at least 300 mm. below pipe invert.

3.3.10 Provide for suppression of dust generated by the removal process.

3.3.11 Remove surfaces to full depth, including granular base courses.

3.3.12 Remove surfaces only to extent of private property lines and structures and where shown to facilitate new work.

3.3.13 Pavement, structures, curbs, etc. slated for removal which are adjacent to existing pavement to remain, shall be neatly and accurately saw-cut prior to removal.

3.3.14 Small pieces of concrete and masonry may be used to back fill with the written permission of the Consultant. Do not use organic or metallic materials for back fill.

3.3.15 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.

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

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

3.3.18 Salvage: items to be salvaged as indicated on drawings.

3.3.19 Carefully dismantle items containing materials for salvage and stockpile salvaged materials at locations designated.

3.3.20 Sealing: Seal pipe ends and walls of manholes or catch basins as indicated. Securely plug to form watertight seal.

3.3.21 Decommission septic, fuel or storage tanks under the most stringent requirements set out by the Ministry of Environment and/or other authority.

3.3.22 Service Connections for Removal: 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.

3.3.23 Service Connections for Retention: Clearly paint, mark and post warning signs on lines to remain in service and promptly repair any damage to maintain active service.

3.4 CLEARING

3.4.1 Clear and remove all debris, asphalt, concrete, rocks, boulders and other useless materials within the project boundaries where necessary for the installation of new work.

3.4.2 Burying of useless materials on the site is not permitted.

3.4.3 Burning of useless materials will not be permitted.

3.4.4 Disposal of useless materials shall be off site and at the Contractor's expense. The Owner shall not be responsible to provide a disposal site.

3.5 RESTORATION

3.5.1 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.

3.6 DISPOSAL

3.6.1 Remove completely from the site all debris resulting from demolition, except for specified salvage and debris used as specified to fill voids below grade.

3.6.2 Remove debris daily, immediately as it accumulates.

3.6.3 Do not overload trucks and otherwise take means to prevent spillage during travel.

3.6.4 Legally dispose of waste materials at certified Waste Management sites and assume all cost of disposal.

3.6.5 Do not sell at site, materials from demolition.

3.6.6 Notify the Owner immediately of any contaminated or dangerous materials.

3.6.7 Dispose of contaminated or dangerous materials immediately, and under the most stringent guidelines set out by the Ministry of Environment and to minimize all dangers.

3.7 COMPLETION AND CLEANING

3.7.1 Keep sidewalks, roadways, parking lots, streets, and highways free of dust and debris from demolition work. Clean up accumulations as they occur.

3.7.2 Clean exposed surfaces and adjacent areas ready for reconstruction operations.

3.7.3 Remove tools, equipment, trash, dust and dirt from the site of operations and leave in a broom clean condition.

3.7.4 Remove protections, barricades and other temporary construction on completion of demolition, except those to be maintained in place protecting access to open areas below grade and new construction work.

3.7.5 Upon completion of work, remove debris, trim surfaces and leave work site clean.

3.7.6 Sweep remaining surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.

3.7.7 On completion of the work of this Section, remove all protection. Make good all damage to this work and to adjoining work due to lack of or failure of such protection. Remove from the site all debris, surplus materials, tools, plant and equipment and leave clean and tidy, in a good and workmanlike manner.

3.7.8 When work of this Section is completed in any given area, assume responsibility for protection. Make good any damaged work or broken glass until acceptance of the completed contract by the Owner.

3.7.9 Remove all debris from the site as work progresses on a daily basis.

3.8 REPAIRS

3.8.1 Repair and make good all property damaged by the Contractor during demolition which was due to negligence on the part of the Contractor at no extra cost to the Contract and to the approval of the Consultant or other Jurisdictional Authority.

END OF SECTION

1. GENERAL

1.1 WORK INCLUDED

Excavation for utility trenches for Division 15 - Mechanical, Division 16 - Electrical.
Consolidation and compaction.
Backfilling for utility trenches for Division 15-Mechanical, Division 16- Electrical.

1.2 RELATED WORK

Section 02110 - Demolition
Division 15 - Mechanical, Division 16 - Electrical: Excavation for utility trenches.

1.3 REGULATORY REQUIREMENTS

1.3.1 Work shall include protection measures, consisting of materials, constructions and methods required by the Occupational Health and Safety Act, R.S.O.1990, of the Province of Ontario, and as otherwise imposed by Jurisdictional Authorities to save persons and property from harm.

1.3.2 Undertake open-cut excavation, and design and erect shoring in accordance with the Occupational Health and Safety Act.

1.4 SUBMITTALS

1.4.1 Submit shop drawings as required by Authorities having Jurisdiction and as specified.

1.4.2 Submit certificate from testing and inspection company showing toxicity or lack thereof of excavated material, to permit landfill disposal of same.

1.4.3 Submit documentation for dewatering procedures.

1.5 SPECIAL PROTECTION

1.5.1 Ensure that adjacent property is not damaged in any way be excavating and grading work; by the removing, stockpiling and transporting of materials; by blown sand and dust or by spillage during the removing, stockpiling and transporting of materials; by the collapse or movement of excavated banks and stockpiles or by storm water from altered drainage course.

1.5.2 Protect existing adjacent building, landscaping, fencing, service poles, wires, underground services and paving located on this and adjoining properties from damage. Ensure no damage is caused by earthwork to existing structures, trees, buried and above-ground services, bench marks, and survey monuments on the site, or adjacent property. Contractor to make good and repair all damage completely and immediately to the acceptance of Consultant and at no cost to the Board.

1.5.3 Protect bottom and sides of excavated pits and trenches from exposure to sun and rain to prevent cave-ins and softening.

1.5.4 Protect the bottom of the excavation and the soil around and beneath any footings, walls, pile caps and slabs, which have been poured from frost.

1.5.5 Keep excavations drained and free of water at all stages of operation. Provide necessary equipment including pumps, piping and temporary drains and trenches.

1.5.6 Provide protection around excavated areas.

1.5.7 Protect excavated material approved for backfilling from freezing.

1.5 **FIELD MEASUREMENTS**

1.5.1 Verify survey bench mark and intended elevations for the Work as indicated.

1.6 **UNIT PRICES**

1.6.1 Submit unit price, /cu m, for extra excavation and disposal of excavated materials required if soft areas are encountered.

2. **PRODUCTS**

2.1 **FILL MATERIALS**

2.1.1 Type 1: Existing inorganic material stockpiled from re-grading operations or from excavation for foundations. Excavated free-draining native material may be reused if kept dry and not exposed to moisture such as snow or rainfall and can be shown to be capable of compaction to required Standard Proctor maximum dry density, otherwise use imported granular material.

At **slab-on-grade** construction: all fill material under slab to be imported granular material.

2.1.2 Type 2: Granular A conforming to OPSS 1010, free of shale, clay, friable material, mud, sand, debris and other deleterious matter.

2.1.3 Type 3: Granular B conforming to OPSS 1010.

2.1.4 Type 4: Crushed stone – clear and clean limestone, 19 mm size.

2.1.5 Type 5: Clean, washed, coarse sand free from clay, shale and organic matter; Granular C conforming to OPSS 1010.

2.1.6 Backfill and fill under areas not to be paved and not to receive floor slabs to be clean excavated material, free from waste materials, debris, rubbish, frozen portions, muskeg, organic or cohesive matter and rocks larger than 75 mm in diameter. If a sufficient quantity is not available, use imported fill having same characteristics.

3. **EXECUTION**

3.1 **EXAMINATION**

3.1.1 Verify fill materials to be reused, are acceptable.

3.1.2 Verify foundation perimeter drainage installation has been inspected, prior to backfilling.

3.2 **PREPARATION**

3.2.1 Generally, compact sub-grade to density requirements for subsequent backfill materials. Proof roll sub-grade at paving and slab-on-grade construction.

3.2.2 Cut out soft or wet areas of sub-grade or surficial fill deposit not capable of in-situ compaction. Under slab-on-grade construction backfill with Type 2 fill and compact to density equal to or greater than requirements for subsequent backfill material.

3.2.3 Cut out loose areas under footings and backfill with lean concrete.

3.2.4 **Slab-on-Grade**:
Fill, topsoil and other deleterious material to be stripped. Floor slab sub-grade to be proof-rolled with heavy roller. Materials to be sub-excavated 900 mm to 1200 mm below grade, as approved by Site Inspector/Consultant. New fill placed under floor slabs to achieve finished sub-grade levels or as foundation excavation backfill to be comprised of approved inorganic material having a moisture content within 3% of the optimum value, placed in maximum 200 mm thick lifts, and compacted to a minimum of 95% of standard Proctor maximum dry density. Minimum 200 mm thick layer of well compacted clear stone. New imported material only to be used.

3.3 **BACKFILLING**

3.3.1 Backfill areas to contours and elevations with unfrozen materials.
Remove debris, shoring, etc. before backfilling.

3.3.2 Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy sub-grade surfaces.

3.3.3 Granular Fill: Place and compact materials in continuous layers not exceeding 150 mm compacted depth.

3.3.4 Soil Fill: Place and compact material in continuous layers not exceeding 200 mm compacted depth.

3.3.5 Employ a placement method that does not disturb or damage foundation perimeter drainage, and protective cover and utilities in trenches.

3.3.6 After footings and foundation walls have been inspected and approved, backfill at exterior perimeter of building and at retaining walls with Granular B.

3.3.7 Under exterior concrete slabs provide minimum 150 mm thick base course of Granular A.

3.3.8 Under interior concrete slabs provide minimum 200 mm thick base course of clear crushed stone.

3.3.9 Ensure that backfill material is replaced under the edge of existing slabs and tamp firmly in place to fill voids.

3.3.10 Maintain optimum moisture content of backfill materials to attain required compaction density.

3.3.11 Backfill against supported foundation walls. Do not backfill against unsupported foundation walls.

3.3.12 Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

3.3.13 Compact backfill with manually operated tampers where access by power operated equipment is limited.

3.3.14 Slope grade away from building minimum 150 mm in 3 m, unless noted otherwise.

3.3.15 Make grade changes gradual. Blend slope into level areas.

3.3.16 Remove surplus backfill materials from site.

3.3.17 Leave fill material stockpile areas completely free of excess fill materials.

3.3.18 Compacted - new imported material to be used under floor slabs.

3.4 **TOLERANCES**

3.4.1 Top Surface of Backfilling: Plus or minus 25 mm from required elevations.

3.5 **ROUGH GRADING**

3.5.1 Rough grade to profiles shown to required levels to allow installation of follow-up materials to produce final grades of levels indicated.

3.6 **PLACING AND COMPACTION**

3.6.1 Employ only approved compaction equipment suitable for the type of material being placed, the degree of compaction required and the working space available.

3.6.2 Compact areas inaccessible to consolidation by mechanical rollers and areas within 1.2m of exterior walls, by hand tampers or rollers operated so as to avoid any damage to existing work.
Do not compact material containing frost.

3.7 **FIELD QUALITY CONTROL**

3.7.1 Field inspection will be performed under provisions of Section 01400.

3.7.2 Provide for visual inspection of bearing surfaces by representative of soil testing company, immediately prior to concrete pour.

3.7.3 Tests and analysis of fill material will be performed in accordance with ASTM D698 and with Section 01400.

3.7.4 Compaction testing will be performed in accordance with ASTM D698 and with Section 01400.

3.7.5 If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.7.6 Proof-roll compacted fill surfaces under paving.

3.7.7 Make good any damage caused by poorly compacted backfill.

3.8 **PROTECTION**

3.8.1 Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.

3.8.2 Protect bottom of excavations and soil adjacent to and beneath foundation, from freezing.

3.8.3 Protect existing trees, existing services, existing and adjacent structures, fences, walls, paving and other property on site and on adjacent property from damage caused by site work.

3.8.4 Provide support for existing buildings, walks, roads and services. Prevent cave-ins of excavated banks.

3.8.5 For excavation within public road allowance, erect barricades to protect public and control traffic, and make good such excavations, roads and sidewalks in accordance with requirements of Authorities Having Jurisdiction.

3.9 **CLEAN UP**

3.9.1 Remove organic materials, topsoil, and all material not suitable for backfill from all areas covered by the building and site work.

3.9.2 Be responsible for all reinstatement of surface paving, slabs, trees, etc. due to later settlement.

3.9.3 Cart all excavated material away daily and dispose of in a legal manner.

3.10 **INSPECTION AND TESTING**

3.10.1 When an Independent Inspection and Testing company is appointed by the Board, cooperate with this company in all respects.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENT

.1 Comply with the applicable requirements of Division
.2 Review Structural Drawings for additional work related to this particular project.

1.2 Work Furnished and Installed

.1 Plain and reinforced concrete
.2 Formwork
.3 Grout under base plates

1.3 Work Installed but Furnished by Other Sections

.1 Anchor bolts Section 05120
.2 Embedded items, sleeves, boxes Divisions 15 and 16
.3 Shelf angles, wall plates and base plates anchored into concrete members Section 05120

1.4 Work Furnished but not Installed

.1 Concrete and reinforcement bars to masonry trade.

1.5 Related Work Specified Elsewhere

Excavating, Trenching and Backfilling
Section 02200 *Masonry*, Section 04200

1.6 Codes and Standards

.1 Comply with the requirements of the Ontario Building Code latest edition at the time of the project, and The Occupational Health and Safety Act, and Regulations for Construction Projects, latest issue including all amendments and revisions.

.2 Keep the following references in the project field office: CSA CAN3-A23.1-M and CAN3-A23.2-M, Reinforcing Steel Institute of Ontario - Manual of Standard Practice, ACI Standard 347 - Recommended Practice for Concrete Formwork.

1.7 Source Quality Control

.1 Before concrete is placed, supply the Consultant with details of the mix proposed for each class of concrete; giving proportions of cement, coarse In addition, fine aggregate, type and amount of admixtures or air entraining agents and water-cement ratio. Certification that compressive strength, slump, air-entrained content and other specified properties will be met.

.2 Provide Consultant with mill test reports properly correlated to the reinforcement.

1.8 Quality Assurance

.1 Obtain concrete from a member of the Ready-Mixed Concrete Association of Ontario that has been issued a seal of Special Quality Concrete who can guarantee to produce concrete with the coefficient of variation less than 12 percent.

.2 Engage an organization with at least 5 years of specialized experience to undertake floor finishing. Submit substantiating references if asked.

1.9 Site Conditions

.1 Determine any potential interference with existing services and protect from disruption and damage.

PART 2 - PRODUCTS

2.1 Concrete Material

.1 Cement :Normal Portland cement to CAN3-A5-M, Type 10.

.2 Use only one brand of cement for architectural concrete.

.3 Mixing water: Clear and potable to CAN3-A23.1-M

.4 Fine aggregate: natural sand to CAN3-A23.1-M

.5 Coarse aggregate: crushed stone or gravel to CAN3-A23.1-M, suitable for NBC type N concrete. Maximum size 20 mm except 12 mm for toppings.

.6 Low density aggregate for light weight concrete to CAN3-A23.1-M.

2.2 Admixtures

.1 Comply with manufacturer's instructions.

.2 Obtain admixtures from single source.

.3 Air Entraining admixture: to CAN3-A266.1-M

.4 Non-Retarding Water Reducing Agent: CAN3-A266.2-M, Type WN

2.3 Grouts

.1 Premixed grout: Minimum strength 40 MPa at 28 days. Install in accordance with manufacturer's recommendations.

.2 Non premixed dry packed grout: 1:3 (cement: sand) and minimum water.

Minimum strength 30 MPa at 28 days.

.3 Use only non-metallic grout in exposed surfaces subject to staining.

2.4 Accessories

.1 Comply with manufactures' instructions.

.2 Water-stop: Polyvinyl Chloride, PVC To CSGB 41-GP-35M, Types 1 and 3

.3 Adjustable wedge anchor - Peerless Wedge, anchor insert malleable Acrow-Richmond, iron Lintel Anchor, Superior Concrete

.4 Drilled concrete anchor - Acrow-Richmond Wej-it or Parabolt Hilti Kwik-bolt

.5 Non-slip nosing insert - Fine Aluminium oxide strips, 6 mm wide x 10 mm deep.

.6 Premoulded joint filler - Bituminous impregnated fibre board to ASTM D1751

.7 Membrane adhesive- As recommended by membrane manufacturer.

.8 Saw cut joint filler - Strenson Ltd., Loadflex

2.5 Curing-Sealing Compound

.1 Clear lacquer type liquid conforming to ASTM C309. It shall not darken or discolour concrete surface, not impair bonding of any material laid over surface and shall be compatible with such materials.

2.6 Floor Surface Hardener

.1 Comply with the manufacturer's instructions.

.2 Non-metallic, natural grey colour:

Masterocon - Master Builders Co. Ltd.
(Curing-sealing compound-Masterseal)

Diameg 7 - Sternson Ltd.
(Curing-sealing compound-Clear Florseal)

2.7 Proportioning

.1 Conform to CAN3-A23.1-M, Section 14. Select mix proportions to provide the specified strength, workability and durability.

.2 Minimum cement content for exposed concrete slabs:

Foot traffic only	- 285 kg/m3
Vehicular traffic with rubber wheels	- 320 kg/m3

.4 Maximum water: cement ratio for concrete subject to freezing and thawing:

- CSA Class C or Class A, according to exposure

.5 Use the following chemical admixtures:

All concrete	- Water Reducing Agent
Concrete subject to cycles of freezing and thawing	- Air Entraining Agent

Obtain approval of the Architect for the use of other admixtures prior to use.

Main parking garage ramp. Corrosion inhibiter

.6 Maximum Slumps:

Foundations, wall and slabs	- 70 mm
Toppings	- 60 mm
Other concrete	- 80 mm

2.8 Production

.1 Use ready-mixed concrete.

.2 Use corrosion inhibitors for ramped slab concrete as per CSA S413-07 recommendations.

.3 Heat concrete and deliver at a temperature between +13□C and +27□C whenever outdoor temperature is less than +5□C.

PART 3 - EXECUTION

3.1 Workmanship

.1 Comply with the requirements of CAN3-A23.1-M and the specific requirements of

the Contract.

.2 Ensure that no water is present on foundation beds where footings and other concrete work is to be placed. Place concrete only on frost-free ground. Remove previously frozen bearing surfaces.

.3 Obtain Consultant's approval prior to placing concrete.

.4 Ensure that reinforcement and inserts are not disturbed during concrete placement.

.5 Do not place load on new concrete until authorized by Consultant.

.6 Bring to the attention of the Consultant any defects or deficiencies in the Work which may occur during construction together with a proposal for remedy. Consultant will decide what corrective action may be taken.

3.2 Records

.1 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken. Record the date of removal of each section of formwork.

.2 Record on drawings the founding elevations of all footings and variations of footing work from that indicated on drawings.

3.3 Cooperation

.1 Cooperate with all engaged on the Project. Exchange with related trades, shop drawings and other data required to coordinate and schedule the

Work. Notify other trades as to when items which are to be installed by they are to be set and protect these items after installation.

.2 Give the Consultant at least 24 hours advance notice of the time when completed reinforcement will be ready for review.

.3 Supply and install grout for base and bearing plates. Coordinate installation with the Structural Steel trade. Grout shall completely fill space between plates and supports.

.4 Cooperate with any trade applying finishes to concrete surfaces to obtain a surface which will have adequate bond. Provide chases where required.

3.4 Examination of Work

.1 Do not begin operations before making a thorough examination of existing conditions and the Work of related trades. Report inconsistencies before proceeding.

3.5 Inspection and Testing

.1 The Consultant will appoint an independent inspection and testing agency to undertake concrete strength tests.

.2 Pay for the cost of inspection from the Cash Allowance, as directed by Consultant.

.3 Assist the agency in its work. Notify it as to the concreting schedule. Provide concrete samples and standard test cylinders.

.4 Laboratory curing and testing of samples will be carried out in accordance with the applicable CSA Standards. The agency will report to the Consultant with copies to Structural Subconsultant, the Contractor and the Municipal Authorities. Reports will be made on a form similar to Appendix C of CAN3-A23.2-M stating the location of concrete to which tests relate and commenting on abnormal results and conditions.

.5 Provide a group of three cylinders for each standard strength test. One specimen will be tested at 7 days and two at 28 days.

.6 Provide one additional site cured cylinder for testing at 7 days when concrete is placed under cold weather conditions.

.7 Take samples at the discharge end of the pipe when concrete is pumped.

3.6 Rejected Work

.1 Do not deliver to the site materials which are known not to meet the requirements of the Specifications. If rejected after delivery they shall be immediately removed.

.2 Where review reveals materials or workmanship which appear to have failed to meet the specified quality or tolerances, the Consultant shall have the authority to order additional curing; to have tests made of in-situ concrete, concrete cores, reinforcement or other materials; to order a structural analysis of the existing elements and to load test the structure. All such work will be carried out in order to assist in determining whether the structure may, in the opinion of the Architect be accepted, with or without strengthening or modification. Testing shall meet the requirements of the Ontario Building Code. All expense incurred shall be chargeable to the Contractor regardless of the results.

3.7 Quality Control On Site

.1 Make all required field measurements.

.2 Do not close deep forms until reinforcement has been reviewed.

.3 Ensure that reinforcement is kept free from dirt, grease, loose mill scale and rust. Ensure that reinforcement is complete, adequately tied and properly positioned for cover in advance of the time scheduled for casting concrete.

.4 Make available to the Consultant, documents to verify that the concrete supplier is qualified to supply ready-mixed concrete and on to review proposed concrete mix design.

.5 Make one standard strength test for each 100 m3, but not less than one test, for each class of

concrete placed each day. Store cylinders in metal lined curing boxes maintained at a temperature of +10`C until shipped to the testing laboratory. Store additional cylinder required for cold weather or hot weather conditions adjacent to Work for 7 days.

.6 Conduct one standard air entrainment test for each 50 m3 of air-entrained concrete or portion thereof placed each day.

.7 Make slump tests with each standard strength test and when so directed by Consultant.

3.8 Joints

.1 Construction Joints:

.1 Provide construction joints where specified or shown on the drawings. Locate and make other joints so as not to impair the required strength of the structure. Joints are subject to the review of the Architect.

.2 Unless otherwise shown, maximum distances between construction joints are:
Walls - 10 m, or 20 m alternating with control joints at same spacing.
Slabs on grade - 7 m, or 20 m with sawcut joints at 5 m centres.

.2 Isolation Joints:

.1 Provide 6 mm thick premoulded asphalt impregnated joint filler of the same depth as the thickness of the concrete wherever slabs on grade abut foundation walls, columns and piers.

.3 Saw-cut Joints:

.1 Saw-cut joints in slabs on grade should generally occur on column lines and on intermediate lines which result in panels of approximately square sections. Sections shall not exceed 5 m in length or width.

.2 Make saw-cuts 3 mm wide and 30 mm deep as soon as the concrete can be cleanly cut and after shrinkage cracks can form. Not less than 21 days after casting, fill all saw cuts with polysulfide joint filler. Joints shall be clean and dry when filled.

3.9 Placement of Concrete

.1 Remove water from excavations before placing concrete therein.

.2 Convey concrete from mixer to place of final deposit by methods which will prevent aggregation of materials and change of concrete qualities. Time for this operation shall not exceed 30 minutes. Deposit concrete as close as possible to its final position.

3.10 Slabs on Grade

.1 Wet the subgrade surface by sprinkling before placement of concrete.
.2 See Drawings for thickness of concrete and slab reinforcing.
.3 Refer to Architectural Drawings for slab depressions, slopes and finishes. Slope floors to drains.

3.11 Surface Finishing

.1 Honeycomb:

In locations where the repair of honeycomb is approved, cut out defective areas and fill the space with a cement mortar of the same materials as the concrete. Incorporate a liquid latex bonding agent into the mix. Apply in layers not exceeding 25 mm in thickness.

3.12 Curing and Protection

.1 Beginning immediately after placement, protect concrete from premature drying, sunshine, excessively hot or cold temperatures, and mechanical injury. Maintain at a relatively constant temperature for as long as is required for hydration of the cement and curing of the concrete. Provide adequate moisture under dry conditions by wetting subgrade and surrounding construction as appropriate.

.2 Minimize moisture loss from surfaces placed against wooden forms, or plastic and metal forms exposed to heating by the sun, by keeping the forms wet until they can be safely removed. If forms are removed in less than 7 days, curing shall be continued by one of the wet curing methods specified for surfaces not in contact with forms.

.3 Select curing methods best suited to the ambient conditions in which the structure is being constructed.

.4 Cure concrete surfaces not in contact with forms by one of the following methods:

.1 Pounding or continuous sprinkling.
.2 Application of absorptive covering kept continuously wet.
.3 Application of fog spray followed by a covering of curing paper lapped 150 mm and held down at all edges.
.4 Application of a curing-sealing compound, where permitted, immediately after disappearance of surface water sheen. Do not use a compound unless it is compatible with any material which may be applied to or laid over the concrete surface.
.5 Curing methods based upon keeping surfaces wet shall continue for at least seven days. Prevent intermittent drying of surfaces.

.6 Do not pile, store or transport materials over slabs until concrete has been in place for at least 7 days.

END OF SECTION

1. GENERAL

1.1 DESCRIPTION

1.1.1 The work described in this Section consists of the supply and installation of grouting of the following:
Anchors
Structural Steel Baseplates
Support Bases
Handrails

1.2 RELATED WORK SPECIFIED ELSEWHERE

1.2.1 Concrete under Section 03300.

1.2.2 Miscellaneous Metalwork under Section 05500.

1.2.3 Building Services under Division 15.

1.3 DELIVERY, STORAGE AND HANDLING

1.3.1 Deliver, handle and store grout materials to prevent deterioration or contamination.

1.3.2 Store materials in their original packaging with labels intact, for protection and identification of product quality and quantity.

1.3.3 Do not open until the enclosed material is required for installation. Protect grout material in storage from moisture gain.

2. PRODUCTS

2.1 GROUT

2.1.1 Provide grout materials and mixes for the work of this Section, in accordance with the following requirements:

2.1.1.1 Pre-blended grout - of non-shrinking, non-metallic type, or approved equal:

a) Masterflow 713 ready-to-use grout, manufactured by Master Builders Technologies Ltd.
b) V-3, as manufactured by W.R. Meadows of Canada Limited
c) Sikagrout 212, as manufactured by Sika Canada Inc.

2.1.1.2 Special mixes - provide special grout preparations and mixes as required for particular work where high strength requirements or other conditions dictate.

2.2 MORTAR

2.2.1 Where required for repair of masonry work, mortar to consist of:
1 part Portland cement
1/2 part lime
4 parts sand aggregate, type S, as defined in N.B.C.

3. EXECUTION

3.1 GENERAL

3.1.1 Strictly adhere to grout manufacturer's instructions regarding handling, mixing, preparation, placing, curing and finishing the work. Measure materials accurately by weight, or by other means where specified or approved. Use potable water free from matter which would be detrimental to the finished qualities.

END OF SECTION

1. GENERAL

1.1 DESCRIPTION

1.1.1 The work described in this section consists of the supply and installation of unit masonry, mortar fill where noted on drawings, and building in items supplied by other trades.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Supplying of reinforcing steel and concrete for block lintels & masonry walls Section 03200.
Supply of loose steel lintels Section 05500.
Insulation under Section 07200.
Cladding under Section 07420.
Fire stopping Section 07250.
Caulking Section 07900.
Doors and Frames under Section 08100.
Supply of access door for mechanical/electrical Division 15 and 16.

1.3 WORK INSTALLED BUT SUPPLIED BY OTHERS

1.3.1 Build into masonry elements, inserts, anchors, bolts, sleeves and other items supplied by other Sections and which are required for installation and performance of work of other sections.

1.3.2 Install reinforcing steel and concrete fill into block lintels and masonry walls.

1.3.3 Install loose steel lintels and bearing plates required for support of masonry elements supplied by others under Division 5.

1.3.4 Build in wall plugs, blocking and bucks provided by others under Division 6.

1.3.5 Build in furring and anchors to receive cladding material under Division 7.

1.3.6 Build in metal flashing and reglets to receive flashing provided by others under Division 7.

1.3.7 Install steel door frames provided by others under Division 8. Grout frames full with mortar.

1.3.8 Set and build in access doors indicated, provided by others under Division 10.

1.3.9 Build in recessed mechanical and electrical items and work provided by others under Division 15 and 16.

1.3.10 Included in the above are all sleeves, brackets, anchors, bolts, inserts for structure and equipment. Provide chases and openings as required. The bond shall not be broken at buried pipes, boxes, or conduits. No patching will be permitted.

1.4 QUALITY ASSURANCE

1.4.1 Meet requirements of CAN3-A370-M84, CAN3-A371-M84 and CAN3-S304-M84.

1.4.2 Ensure that work is executed under the continuous supervision and direction of a competent foreman.

1.4.3 Comply with details and construction notes when constructing fire rated walls and partitions. Solidly fill around beams and joists penetrating fire rated walls/partitions in accord with requirements of Ontario Building Code.

1.4.4 Masonry units used in partitions/walls designated to provide a fire separation shall be of thickness and material required to achieve required rating. Hollow masonry units used in fire separations shall have required percentage of solid material to meet required rating. Concrete block used in fire rated elements shall be suitably identified to permit verification of fire rating.

1.4.5 Provide standard tests as carried out by a recognized testing company, acceptable to consultant, on the actual production run of brick including compression, absorption, and saturation coefficient. Provide 50 cycle freeze-thaw resistant test. Brick must meet specified requirements.

1.5 EXISTING CONSTRUCTION

1.5.1 Make up sample brick and sample mortar for comparison on mortar to match existing.

1.5.2 New brick unit is to match existing brick colour as closely as possible.

1.6 DELIVERY, STORAGE AND HANDLING

1.6.1 Deliver cement, lime and mortar ingredients with manufacturer's seals and labels intact. Store under dry conditions. Protect aggregates from weather and inclusion of foreign matter. Store aggregates and masonry units on approved cleared platforms or pallets and cover with tarpaulins. Store masonry units above and off ground on level platforms which permit air circulation under stacks.

1.6.2 Deliver and handle masonry units by methods which will guard against soiling and chipping. Dumping from vehicles will not be permitted.

1.6.3 During storage, protect masonry units against moisture absorption, damage and staining.

1.7 PROTECTION

1.7.1 When work is not in progress, cover tops of masonry elements exposed to weather with non-staining weatherproof covers. Covers shall be at least 24" wider than masonry elements and shall be well secured against displacement.

1.7.2 Protect finished work at corners, sills, projections, and other areas likely to be damaged, with suitable coverings until completion of building.

1.7.3 Adequately brace masonry walls and partitions to resist effects of wind and other lateral forces.

1.7.4 Protect the work of other trades from damage resulting from the work of this section.

1.8 ENVIRONMENTAL CONDITIONS

1.8.1 HOT AND COLD WEATHER WORK

1.8.1.1 When outside temperature is below or likely to go below 5^0c, provide heat to maintain temperature of materials and surrounding air at 5^0c or higher during laying and for 72 hours thereafter. Submit

for approval the proposed method of protecting masonry against low temperatures. Salamanders will not be permitted.

1.8.1.2 Keep units completely free from ice and frost. Preheat mortar materials and mortar boards. Temperature of mortar shall be between 21^0c and 48^0c. Protect mortar from frost. Do not use admixtures or antifreezes in mortar.

1.8.1.3 Maintain dry beds for masonry and use dry masonry units only. Do not wet masonry units in winter.

1.8.1.4 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

1.8.1.5 Salt or other chemicals for lowering the temperature of the mortar shall not be used, nor any other admixtures be used unless specified.

1.8.1.6 No materials shall be heated above 49^0C (120^0F).

2. PRODUCTS

2.1 FACE BRICK MASONRY MATERIAL

2.1.1 Face brick not used in this project-

2.2 CONCRETE BLOCK

2.2.1 Blocks for non–load–bearing units shall conform to CAN/CSA–A165.1–M85; H/7.5/C/M for hollow units, and S/12.5/C/M for solid units. Blocks used in construction of walls designed to support floor or roof, shall be load–bearing units, conforming to CAN/CSA–A165.1–M85; H/15/A/M for hollow units, and S/15/A/M for solid units.

2.2.2 Architectural Block;

2.2.3 Concrete Block - autoclaved 190 mm x 390 mm face dimension - Standard, solid, semi-solid, lintel and header as required.

2.2.4 Bull-nosed and double bull-nosed for exposed external corners with 1" radius.

2.2.5 Lightweight Block (CB) To CAN3-A165 Series M85 H/15/C/M and S/15/C/M. Acceptable manufactures include Primeau Argo, TCC Peel, CBM or other source approved by consultant.

2.2.6 Normal Weight Block to CAN3-A165 Series M85 H/15/A/M/ and S/15/A/M.

2.2.7 Units must be cured for at least 28 days before delivery and shall have a moisture content of not more than 30% of total absorption.

2.2.8 Size unless indicated, to match existing. and metric modular x thickness as shown on drawings.

2.2.9 Exposed concrete block units shall be uniform in size, free of perceptible warp or twist, without chipped, ragged or broken edges; have a uniform surface texture, free of cracks, blemishes or

defects detrimental to appearance or performance. All concrete block units shall be autoclaved and free of damage, surface indentations, surface cracks or other blemishes.

2.2.10 Where indicated on drawings construction notes and/or specifications, provide solid or semi-solid units.

2.2.11 Provide manufacturer's catalogued special units such as bullnose, corner, lintel block and others as indicated on drawings and in construction notes.

2.2.12 Conform to National Building Code for requirements of masonry units for fire rated walls, of ratings required and not less than 75% solid, 3 core, for hollow units.

2.3 **METAL REINFORCEMENT AND ANCHORS**

2.3.1 Material High tensile strength steel wire meeting ASTM A82, by Blok-Lok or Dur-O-Wal.

2.3.2 Finish Hot dip galvanized after fabrication to ASTM A153, Class B.

2.3.3 Horizontal Reinforcement

2.3.3.1 Horizontal mesh reinforcement shall be heavy–duty 4.8 mm steel rod, hot dip galvanized with 1.5 oz. per sq. foot, truss or ladder design, manufactured by Blok–Lok Limited, Dur–O– Wal Ltd., or approved equal. Provide all factory fabricated pieces required. Reinforcing width shall be 50 mm less than the total wall thickness.

2.3.3.2 Single Wythe and Solid Walls Truss type with minimum 9 ga thick side and cross rods unless otherwise indicated; width 2" less than wall thickness BLOK-TRUS BL30.

2.3.3.3 Cavity Walls (coursing not aligned) 2 wire truss type, back-up wythe reinforcement 3/16" rods and 3/16" box ties, with restraining rod welded on, at each intersection point; and 3/16" hook box ties BLOK-LOK BL37.

2.3.3.3 Provide prefabricated assemblies for corners and intersections.

2.3.3.4 Masonry Connectors and Reinforcing, Cavity Wall Alternate:
Masonry Connectors and Reinforcing: Shall be to CSA-A370-04 for connectors and CSA-A371-04 for reinforcing. For tying brick and concrete block veneers to brick, architectural block and concrete block use Fero Block Shear tie (or approved equal) in combination with 2-wire ladder horizontal reinforcing 3.66 mm dia. Wire side and cross rods. Tie connector length shall suit concrete block width plus thickness of specified insulation with sufficient length to provide placement of V-Tie legs at center-line of veneer (outer width). All components to hot dipped galvanized after fabrication.

2.3.4 Anchors & Ties

2.3.4.1 Wall Ties for masonry veneer shall be corrugated hot dip galvanized steel, 32 mm wide x 0.76 mm thick and length to permit minimum 75 mm embedment into each bearing. At wood framing bend minimum 40 mm for fastening to framing. Space ties at maximum 400 mm vertical, and 600 mm horizontal. Fasteners shall be corrosion–resistant.

2.3.4.2 Nonbearing Walls and Partitions to Bearing Walls Corrugated wall ties minimum 22 ga thick, 7/8" x 7" BLOK-LOK BLT7A.

2.3.4.3 Masonry Walls, Partitions & Veneer to Concrete Elements Flexible wire tie, 3/16" thick, length to suit wall condition, and dovetail anchor slot BLOK-LOK BLT8 or POS-I-TIE NWTC-TAPCON screw anchors by National Wire Products Industries Inc. Reinforcing for concrete block lintels shall be deformed steel bars conforming to CAN/CSA–G30.18–M92.

2.3.4.4 Masonry to Structural Steel Flexible triangular 3/16" thick ties and weld on anchor straps BLOK-LOK FLEX-O-LOK BLT9 or POS-I-TIE NWDI-DRIL-IT screw anchors by National Wire Products Industries Inc.

2.3.4.5 Strap Anchors Galvanized, 14 ga thick, crimped, 2" x 6".

2.4 **LATERAL SUPPORT ANCHORS**

2.4.1 Masonry Wall -Top Stabilizing Anchor, DUR-O-WAL - mechanical anchoring system- steel dowel, vertically welded to galvanized steel plate

2.4.2 Prime coated steel angles 3" x 3" x 8" long x 1/4" thick.

2.4.2.1 Steel CAN3-G40.21-M81, minimum 260W.

2.4.2.2 Primer CGSB 1-GP-40M.

2.4.2.3 Fasteners Expansion type concrete anchors, two per angle.

2.5 **PREMOULDED JOINT FILLER, NON-FIRE RATED LOCATIONS**

2.5.1 Closed cell vinyl foam, compressed 25% when in joint, one of the following:

2.5.2 Uniform R 1009 - Flexible by Goodco Ltd.

2.5.3 Rodofoam PR by Sternson Ltd.

2.6 **FLASHING AND DAMPCOURSE**

2.6.1 Dampproof Course and Membrane Flashing Blueskin® TWF manufactured by Bakor, a SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film.

2.6.2 Primer for Dampproof Course and Membrane Flashing Blueskin® Primer manufactured by Bakor, a quick setting synthetic rubber based adhesive.

2.6.3 Mastics & Termination Sealants Liquid air seal mastic be 230-21 Insulation Adhesive manufactured by Bakor, a synthetic, trowel applied, rubber-based adhesive, conforming to CGSB 71-GP-24M, resistance to alkalis and salt.

2.6.4 Flashing Back-Up Minimum 20 ga thick aluminized sheet steel. Galvalume by Dofasco.

2.6.5 Weep Holes DA 1069 Cell Vent by Dur-O-Wal.

2.6.6 Bonding Agent for Parging Surfacrete Concentrate by Sternson.

2.7 **MORTAR MIXES**

2.7.1 Mortar shall conform to CSA–A179–M1976. Use type `S' for block below grade and reinforced brick. Use type `O' for non–bearing walls and use type `N' or Type 'S' for all bearing walls including brick veneer. (See Structural Drawings).

2.7.2 Water conforming to CSA–A–179–M1976 and shall be potable, clean and free from injurious amounts of salt, oil, acid, alkali, organic matter or other deleterious substance.

2.7.3 Sand - clean sharp - CSA Specification A82-56 M 1976.

2.7.4 Lime - hydrated lime - CSA Specification C-82-43.

2.7.5 Cement - Portland Cement - CSA Specification CAN3-A5.

2.7.6 Masonry cement used in mortar shall conform to CAN/CSA–A8–M88.

2.7.7 Aggregate used in mortar shall conform to CSA–A 82.56–M76.

2.7.8 Hydrated lime shall conform to CSA–A179–M1976.

2.7.9 Quick lime shall conform to CSA–A179–M1976.

2.7.10 Colour and texture of mortar to match existing. Cement mortar.

3. EXECUTION

3.1 WORKMANSHIP

3.1.1 Execute work by skilled persons in accordance with the N.B.C. and CAN3–5304–M84.

3.2 PREPARATION

3.2.1 Establish all lines, levels and coursing and protect from disturbance.

3.2.2 Coordinate all work with other trades and prepare all items to be built in.

3.3 GENERAL INSTALLATION

3.3.1 Place masonry in accordance with lines and levels indicated on drawings.

3.3.2 Lay masonry work in uniform manner. No one portion of work shall rise more than 2'-6" above general level. Do not lay more than 5'-0" in height of any wall in any working day.

3.3.3 No masonry wall less than 8" thick is to touch underside of structure above. A 1" gap will be left for placement of fire rated expanding foam. Some of these walls require mechanical lateral support (see structural). Exterior walls and internal 8" brick walls such as around elevators are to be built tight to underside of slabs on beam above.

3.3.4 Cut exposed masonry units with power driven masonry saw only. Provide straight and true edges, ragged or chipped edges will not be permitted.

3.3.5 Consult with other Sections to avoid cutting and patching. Cooperate in setting and aligning built-in items. Build in conduit and piping so that they are not exposed. Do not break masonry bond to accommodate concealed built-in items.

3.3.6 Grout solid with mortar all spaces around built-in items.

3.3.7 Build in metal nailing plugs, grounds, inserts, anchor bolts, bearing plates, loose and miscellaneous items of steel and iron, isolated beams, lintels and shelf angles, sleeves, blocking and items furnished by other Sections.

3.3.8 Do not shift or tap masonry units after mortar has taken its initial set. Where adjustments must be made, remove mortar and replace.

3.3.9 Fully bond external and internal corners and intersections.

3.3.10 Buttering corners of joints, deep or excessive furrowing of mortar joints is not permitted.

3.3.11 Where non–bearing masonry partitions extend to underside of floor, roof deck or structural system, stop masonry short 10 mm to 13 mm to allow for live load deflection. Fill gap with joint filler. Provide structural anchorage in accordance with CAN 3–S304–M84.

3.3.12 Ensure masonry courses are of uniform height. All vertical and horizontal joints are to be equal and of uniform thickness. Lay in full bed of mortar, properly joined with other work.

3.3.13 Remove excess mortar and projections. Take care to prevent breaking masonry corners.

3.3.14 Apply through-wall flashing and damp-proof coursing membrane in accordance with CSA A371-94 Masonry Construction for Buildings; along the base of masonry veneer walls, over windows, doors and other wall openings required to be protected.

3.3.15 Where non-load bearing partitions extend to 1" from underside of structure, tightly pack space between top of partition and underside of structure with 1 hour fire rated expanding foam.

3.3.16 Provide paper-backed galvanized steel lath as required for support of grout and mortar fill within masonry elements.

3.3.17 Install access doors occurring in masonry elements, required by Divisions 15 and 16. Install access doors plumb, level, properly aligned and securely anchored, in locations directed by Divisions 15 and 16.

3.4 CHASES, OPENINGS & HOLES

3.4.1 Chases and openings shall be built in during erection of masonry work, and purpose-made chased units shall be built into proper position.

3.4.2 Openings in masonry work exceeding 8" opening width shall be provided with lintels in accord with lintel schedule.

3.4.3 Chasing of completed walls or formation of holes shall only be carried out with inspector's prior approval and then only with a tool designed to cleanly cut masonry units.

3.4.4 Chases shall be plumb and shall be a minimum of one unit length from jambs of openings.

3.4.5 Horizontal or diagonal chases are not permitted.

3.5 **MASONRY BEARING**

3.5.1 Masonry bearing shall extend full thickness of wall.

3.5.2 Unless otherwise indicated provide at least 8" of bearing for lintels and beams.

3.5.3 Bearings of Block Masonry Walls Use minimum 2 courses of solid or grouted block units except where concrete bearing pads are required.

3.5.4 Build masonry neatly around beam and lintel bearings.

3.6 **CONSTRUCTION JOINTS**

3.6.1 Where fresh masonry joins partially or totally set masonry, clean exposed surfaces of set masonry and remove loose mortar and foreign material prior to laying fresh masonry.

3.6.2 If necessary to stop off a horizontal run of masonry, rack back one-half masonry unit length in each course. Toothing will not be permitted unless approved by the consultant.

3.7 **BLOCKWORK**

3.7.1 Blockwork shall be laid up in running bond except where otherwise indicated on drawings. Unless indicated, blocks shall be of thickness required to produce totally wythe thickness. Course to match height of existing walls. Form concave mortar joints except for exposed locations and flush struck joints where concealed.

3.7.2 Unless indicated, provide lightweight concrete block in exposed locations except at bearing walls, where normal weight block is required.

3.7.3 Do not wet blocks before laying.

3.7.4 Units shall be laid with webs aligning one over the other in full bed of mortar over entire laying surface including webs.

3.7.5 Exposed faces shall be full units laid out to minimize cutting with not less than 4" at any vertical edge or corner.

3.7.6 Top course of block walls shall be laid with semisolid blocks at door and window sills, at wall changes to brick and where shown on drawings.

3.7.7 Use solid block for at least two courses under all point bearing loads.

3.7.8 Form exposed external block foundation corners with end units.

3.7.9 Provide bull-nose block at all exposed block corners. Grind smooth projections and ridges at bull-nose created by block fabrication process.

3.7.10 Provide minimum 16" solid or grouted block for jambs of openings and at ends of walls.

3.7.11 Cope or cut with power saw exposed units to accommodate flush mounted electrical outlets, grilles and other components. Leave maximum 3/16" clearance. Cover plates and flanges must cover cut edges.

3.7.12 Lay sound absorbing block with the open side of the cavity facing down. Keep slots free of mortar and debris.

3.7.13 Take special care to prevent mortar or other substances from staining exposed block faces. Replace stained blocks as directed by the consultant at no extra cost to contract.

3.7.14 Ensure there is always a mortar line at the freshed floor line.

3.8 **BLOCK LINTELS**

3.8.1 Provide reinforced concrete block lintels over openings where steel lintels are not scheduled.

3.8.2 Unless otherwise specified, reinforcement in concrete block lintels shall be as follows:
Up to 1200 mm span – 200 mm deep lintel – 2–15 M bars
Up to 2400 mm span – 400 mm deep lintel – 2–20 M bars

3.8.3 Use reinforcing bars of full length only.

3.8.4 Place and consolidate concrete without disturbing reinforcing.

3.8.5 Build block lintels; install reinforcement and concrete fill. Unless otherwise detailed make lintels 8" high.

3.8.6 Lintels shall have minimum 8" bearing on each side of opening, unless otherwise indicated on drawings, with care taken in layout of wall to ensure that lintel jointing coincides with regular bond of wall.

3.8.7 Allow lintels to reach maximum strength before removing temporary supports.

3.9 **BOND BEAMS**

3.9.1 Provide bond beams where and as indicated on drawings.

3.9.2 Reinforce with 2–15 M bars 24 mm from bottom and lap splices in accordance with CAN3– A23–M84.

3.9.3 Concrete shall be 20 MPa. Reinforcing shall be deformed bars with a minimum yield strength of 400 MPa.

3.9.3 Provide building paper in joint at bearings and at vehicle joint at ends of block lintels to break bond.

3.10 **BRICKWORK**

3.10.1 Lay face brick in common running bond except where specifically shown otherwise. Provide header, soldier, rowlock and special band courses where indicated. Provide solid soldier course units at outside corners; 45˚ cut units will not be accepted. Course block units to match existing brick coursing. Form concave mortar joints.

3.10.2 Completed brickwork shall appear uniform and well blended, free of contrasting areas. Replace at no cost to contract, brickwork which does not meet this requirement.

3.10.3 Brick with an absorption rate of over 1 oz./min./30 sq." when tested in accordance with ASTM C67 shall be dampened before laying.

3.10.4 Tops of walls which have been left exposed for any period of time shall be dampened before work is commenced again, if required.

3.10.5 Brickwork at different levels shall be stepped in regular proportions between levels.

3.10.6 Brickwork shall be laid up with the shove joint method in full bed of mortar with vertical and horizontal joints filled flush. Slushing mortar into joints after brick is laid is not permitted.

3.10.7 All joints in brickwork, including bed and collar joints, shall be filled flush as each coarse is laid. Pull down and rebuild walls/partitions which do not meet this requirement as directed by consultant and at not extra cost to contract.

3.10.8 Variations in size of brick shall be evenly distributed in wall so that mortar joints are uniform throughout.

3.11 CAVITY WALLS

3.11.1 Discuss all aspects of cavity wall construction with inspector before proceeding to ensure that the cavity wall is constructed in accordance with the best masonry practice and recommendations of the Ontario Masons' Relations Council (O.M.R.C.).

3.11.2 Erect interior wythe masonry and coordinate with Sections 07195 and 07200 for installation of air barrier and insulation.

3.11.3 Ensure that air barrier and insulation are complete and have been inspected and accepted by inspector prior to installation of exterior wythe masonry.

3.11.4 Coordinate with Section 07200 to ensure that the cavity wall compartment seals are installed in the correct locations, allowing proper interfacing with exterior veneer.

3.11.5 Include Mortar Net® with Insect Barrier by Dur–O–Wal Limited to Keep the cavity completely clean and free from mortar droppings or projections. Bevel the "cavity" edge of the mortar bed immediately after "stringing" the mortar.

3.11.6 Upon inspector's request remove small sections of exterior wythe brickwork at base of wall in locations determined by inspector to determine condition of cavity. Remove and rebuild sections of walls where cavity contains excessive amounts of mortar droppings. After inspection, patch inspection openings with matching masonry work.

3.12 REGLETS & RECESSES

3.12.1 Form continuous reglets and recesses in masonry elements as shown on drawings and as required to accommodate work of other sections.

3.12.2 Rake out mortar joints and/or make saw cuts in masonry units as required.

3.12.3 Make reglets 1" deep, unless otherwise shown.

3.13 **JOINT WORK**

3.13.1 Make joints uniform and 3/8" thick unless otherwise shown on drawings.

3.13.2 Joints in exposed and painted surfaces and in masonry behind wall mounted and built-in fixtures, shall be tooled when thumbprint hard with a 1" o/d. plastic tool to produce a concave joint.

3.13.3 Joints in unparged masonry below grade shall be pointed tight with a trowel.

3.13.4 Joints directly behind resilient base, rigid insulation, ceramic tile and gypsum board shall be struck flush.

3.13.5 Weather Precautions:

Provide adequate shelter to ensure that mortar is not permitted to harden prematurely from exposure to sun and wind. Mix mortar only as required for immediate use.

3.13.6 Repointing Mortar Joints:
Rake out mortar joints which are weathered, contain loose mortar, or do not provide a full weather tight mortar joint, in locations noted on drawings. Remove existing mortar with a wire brush, chisel or masonry saw blade. Care must be taken to ensure that masonry units are not damaged. Remove and replace broken or damaged masonry units with new units to match existing. Before filling joints, remove all loose particles and dust. Fill joints in layers allowing each layer time to harden before the next layer is applied. Ensure that joints are entirely filled. All mortar joints shall be tooled. Profile of joint shall match existing.

3.14 **ANCHORING, BONDING AND REINFORCEMENT**

3.14.1 Anchor or bond walls and partitions at points where they intersect.

3.14.2 Except where stack bond is required bond each wythe or masonry walls and partitions at corners by alternately bonding 50% of unit so each wall and partition at corner intersection.

3.14.3 Bond non-load bearing walls and partitions to load bearing walls with ties spaced at 16" o/c. vertically. Provide one tie for each 4" thickness, or part thereof, of wall or partition.

3.14.4 Anchor masonry walls and partitions to concrete elements with anchors spaces at 16" vertically.

3.14.5 Unless otherwise indicated reinforce all walls and partitions with continuous horizontal metal reinforcement, installed at 16" o/c. vertically.

3.14.6 At all wall openings place continuous reinforcement in first and second mortar joints above and below openings. Additional reinforcement at openings shall extend 24" beyond both sides of openings.

3.14.7 Install prefabricated corner assemblies at corners.

3.14.8 Lap continuous reinforcement 6" at splices. Cut reinforcement at control joints.

3.14.9 Tie masonry veneer to concrete back-up with veneer anchors at maximum 16" vertically and 2'- 8" horizontally.

3.14.10 Provide lateral support at top of nonbearing masonry partitions. Fasten masonry wall-top stabilizing anchors to structural deck or beam at maximum spacing as indicated on drawings. Clearance for deflection as indicated on drawings.

3.14.11 Provide galvanized crimp ties 36 mm x 200 mm long 24 gauge steel for bonding where toothing is not possible. "Herringbone" or "Chevron" pattern. Connectors and anchors in accordance with CAN3-A370-M84.

3.15 **GROUTED MASONRY**

3.15.1 Provide grouted masonry at load bearing walls in accordance with requirements shown on structural drawings.

3.15.2 Meet requirement of CAN3-S304-M84 Part 5 and CAN3-A371-M84 5.9 "Grouted Masonry" except where indicated otherwise.

3.16 **CONTROL JOINTS**

3.16.1 Provide control joints in masonry walls at maximum 12'-0" at interior partitions supported by framed slabs, at maximum 25'-0" o/c. at walls supported by foundation walls or footings, and where shown on drawings. Confirm actual locations of control joints with inspector before starting work.

3.16.2 Provide control joints at intersection of bearing and nonbearing walls.

3.16.3 Provide horizontal control joints below shelf angles.

3.16.4 Construct control joints as shown on drawings. Unless otherwise shown make control joints 1/2" wide. Cut masonry reinforcement at vertical control joints.

3.17 **DAMPPROOF COURSING & MEMBRANE FLASHING**

3.17.1 Install damp proof course at top of foundation walls and where shown on drawings.

3.17.2 Install through-wall flashing membrane in accordance with CSA A371-94 Masonry Construction for Buildings and at the following locations
i) Door heads.
ii) Window heads.
iii) Immediately above horizontal interruptions within exterior walls.
iv) Where indicated on drawings.

3.17.3 Prime surfaces to receive dampproof course by roller or spray and allow minimum 30-minute open time. Primed surfaces not covered by self-adhering membrane during the same working day must be re-primed.

3.17.4 Applications shall form a continuous flashing membrane and shall extend up a minimum of 200 mm up the back-up wall.

3.17.5 At the end of each days work seal the top edge of the membrane where it meets the substrate using liquid air seal mastic. Trowel apply a feathered edge to seal termination and shed water.

3.17.6 Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry veneer. At locations where flashing terminates or intersects wall openings including door frames, “end dam” flashing to protect openings and redirect water out. Trim off excess as directed by the consultant.

3.17.7 Apply dampproof coursing membrane over slabs on grade, prepare and prime surfaces, align and position membrane between slab and masonry block work.

3.17.8 Align and position the leading edge of self-adhering through-wall flashing membrane with the front horizontal edge of the foundation walls, self angles and other substrates to be protected, partially remove protective film and roll membrane over surface and up vertically.

3.17.9 Press firmly into place. Ensure minimum 50 mm overlap at all end and side laps. Promptly roll all laps and membrane to affect the seal.

3.17.10 Ensure all preparatory work is complete prior to applying self-adhering through-wall flashing membrane.

3.17.11 Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry veneer. Trim off excess as directed by the consultant.

3.17.12 Unless otherwise indicated carry membrane flashing up behind brick masonry units minimum 8" and turn into concrete block back-up. Mechanically secure top edge at concrete back-up.

3.17.13 Where indicated provide formed metal flashing back-up for support of membrane flashing. Form metal back-up to profile indicated; secure back-up to supporting work.

3.18 WEEPING HOLES

3.18.1 Install weep holes and vents in vertical mortar joints of exterior face of cavity wall, at 32" o/c. spacing horizontally just above membrane flashing, shelf angles and beams, and at top of walls, and where shown on drawings, as detailed to effect evaporation of moisture build–up. Weepholes and vents shall be closed with Neoprene louvered inserts, or "DA1069 Cell Vent" by Dur–O–Wal Limited.

3.18.2 Keep face of inserts back from face of brick minimum 1/4". Keep weep holes free of mortar.

3.19 STEEL DOOR FRAMES

3.19.1 Install steel frames in masonry walls. Build in frames rigid, true and plumb. Fill voids between frames and masonry with mortar grout.

3.19.2 Brace frames solidly in position while being built in. Provide temporary horizontal wood spreader at mid-height of frames to ensure maintenance of required frame width until masonry work is completed. For frames over 4'-0" width provide temporary vertical support at centre of head.

3.19.3 Comply with installation requirements specified under Section 08100.

3.19.4 At no time is a frame to be installed flush with a block surface. See frame details.

3.20 BUILT–IN WORK

3.20.1 As work progresses, build in hollow metal frames, steel angle lintels, nailing strips, anchor bolts, plates and all other items supplied by other sections of work.

3.20.2 Build in items plumb and true to lines and levels indicated on drawings.

3.20.3 Bed anchors of hollow metal frames in mortar joints. Fill frame voids solid with mortar. Fill masonry cores with grout minimum 200 mm from framed openings.

3.20.4 Do not build in organic materials which will be subjected to rot or deterioration.

3.21 **CUTTING AND FITTING**

3.21.1 Cut and fit concrete block for chases, pipes, conduit, sleeves, and grounds. Cooperate fully with other sections of work to ensure correct size, shape, and location.

3.21.2 Obtain Architect's approval prior to cutting or fitting any area which is not indicated on drawings, or which may impair appearance or strength of masonry work.

3.21.3 Fill hollow masonry solid with mortar for 300 mm minimum around openings.

3.22 **PARGING**

3.22.1 Provide parging at masonry foundation walls scheduled to be damp proofed and at other locations where indicated. Do not parge walls scheduled to be waterproofed.

3.22.2 Parging Mix 1 part Portland Cement and 3 parts Sand by volume mixed with sufficient water to produce workable mix.

3.22.3 Bond Coat Mix 60 lb.. Portland Cement and 1 gal. Surfacrete Concentrate and 1 gal. water.

3.22.4 Prepare substrates and apply bond coat in accordance with bonding agent manufacturer's recommendations. Apply parging minimum 1/4" thick, trowelled to smooth surface.

3.23 **PATCHING & CLEANING**

3.23.1 At completion of work, holes and other defects in masonry joints shall be repaired and masonry surfaces shall be thoroughly cleaned.

3.23.2 Holes in masonry joints shall be filled with mortar and suitably tooled. Cut out repoint defective joints.

3.23.3 Dry brush masonry surfaces at end of each day's work and after all final pointing.

3.23.4 Remove mortar smears and droppings from concrete block masonry surfaces after such smears and droppings have dried. When mortar joints are dry and hard, clean block masonry surfaces by rubbing down with abrasive blocks and stiff fibre brushes.

3.23.5 Remove mortar particles from clay masonry surfaces with wood paddles. Rub masonry surface with a dry brush to remove loosened particles and dust. Remove remaining stains from clay masonry surfaces by wet cleaning in accordance with manufacturer's recommendations.

3.23.6 Remove efflorescence from masonry surfaces by wet cleaning in accordance with manufacturer's recommendations.

3.23.7 Upon completion of work, clean blockwork by brushing and washing. In extreme cases a 5% solution of muriatic acid may used, preceded and followed by a copious bath of clean water. Clean block work to be painted to suit requirements of Section 09900.

3.23.8 Point or replace defective mortar. Match adjacent work.

3.23.9 Clean soiled surfaces using a non–acidic solution which will not harm masonry or adjacent materials. Consult masonry manufacturer for acceptable cleaners. Use non–metallic tools in cleaning operations.

3.24 **MASONRY REPAIR**

3.24.1 Make good existing masonry disturbed by the alterations. Provide masonry infill as indicated on drawings. Match existing materials and construction. Reinstated work shall be to the Architect's approval. All masonry repair work to match existing and comply with requirements for matching historical materials and details.

3.24.2 Where existing masonry has been removed, ensure that remaining previously attached masonry is solid and forms a flat surface, re-mortar or rebuild as required.

3.24.3 For masonry repair, use texture, profile, thickness and size to suit existing wall conditions. Match existing joint profile.

3.24.4 For repair work at existing, reuse existing brick wherever possible.

3.24.5 Tooth in new masonry to match existing bond where infilling existing openings or repairing saw cut edges of new opening.

END OF SECTION

1. GENERAL

1.1 DESCRIPTION

1.1.1 Comply with Section 01005 "General Requirements".

1.1.2 The work described in this Section consists of the supply and installation for miscellaneous metals, fabrication, assembling erection prime, finish and touch–up painting including the following items:

.1 Lateral support angles for non-load-bearing masonry walls & partitions
.2 Loose lintels, plates angles and other framing members required but not shown on structural drawings
.3 Other metal fabrications required as indicated on drawings

1.1.3 Unless otherwise specified, extent of work shall also include all items listed in Article 2.3 of the Canadian Institute of Steel Construction Code of Standard Practice for Structural Steel for Buildings, latest revision.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Sealants under Section 07900.
Drywall under Section 09250.
Painting under Section 09900.
Fixing of Mechanical Equipment under Division 15.

1.3 QUALIFICATIONS OF WELDING

1.3.1 Perform Work in accordance with CSA W47.1 and CSA W55.3.
The welding shop and operators, equipment, materials and methods employed on the work are to be certified by the Canadian Welding Bureau conforming to CSA W47.1.

1.4 SUBMITTALS

1.4.1 Submit shop drawings of all items of this Section to requirements of Section 01300.

1.4.2 Indicate on shop drawings, profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.

1.4.3 Shop drawings shall bear the stamp and signature of the Engineer, registered in the Province of Ontario, responsible for the design of the work of this Section.

1.5 FIELD MEASUREMENTS

1.5.1 Verify that field measurements are as indicated on shop drawings.

1.6 HANDLING AND STORAGE

1.7.1 Store and handle to prevent damage, warping, chipping and scraping of the paint coat.

2. PRODUCTS

2.1 MATERIALS

2.1.1 Materials Generally: New, free of rust, waves buckles or other defects which are visible or that may impair structural adequacy and durability.

2.1.2 Steel: Structural; CAN/CSA-G40.21-92, Grade 44W, for rolled sections and Grade 50W for hollow sections, otherwise of hot or cold rolled in alloy to suit needs of fabrication, use, appearance, and specified finishes.

2.1.3 Galvanizing – Hot dipped with a minimum coating of 275g/sq.m. of surface and to CSA G164–M1981.

2.1.4 Anchors: Where exposed, colour of anchor to match colour of material to be fastened; colour of metal to match metal anchored. Where not exposed, galvanized steel.

2.1.5 Angle lintels: welded or bolted back to back steel angles to profiles indicated, to sizes indicated for openings, provide minimum 6” bearing for ends. Finish: shop painted.

2.1.6 Bituminous Paint: Alkali resisting, CAN/CGSB 1.108-M89.

2.1.7 Prime Paint on Steel: CISC/CPMA 1-73a for concealed work and CISC/CPMA 2-75 for exposed work, for finish painting.

2.1.8 Fabricate metal fabrications to ensure that work will remain free of warping, buckling, opening of joints and seams, distortion and permanent deformation.

2.1.9 Fit joints, corners, copes, and mitres tightly, smoothly, and in true planes, and with concealed fastening unless this is impossible by detail. Provide for differential movements within assemblies and at junctions between this and other work.

2.1.10 Weld connections where possible; bolt where not possible, cut off bolts flush with nuts, countersink bolt heads and provide means to prevent loosening of nuts. Make welded joints continuous, tight and flush, ground smooth where exposed to view.

2.1.11 Finish surfaces and edges smooth, including holes. Fill joints and depressions with metal paste filler and welds, and grind smooth.

2.1.12 Support work with level bearings. Machine grind bearing surfaces at loose components.

2.1.13 Holes and Connections: Ream holes and include connectors as required for other work.

2.1.14 Priming of Steel: One coat of prime paint on surfaces except where field welded or embedded in concrete. Remove from surfaces loose scale, rust, dirt, weld flux, and other foreign materials, and grind sharp projections smooth before priming. Work paint into all crevices and finish smoothly. Give surfaces inaccessible to finish painting two coats of prime paint.

3. EXECUTION

3.1 EXAMINATION

3.1.1 Before commencing work, make a thorough examination of other work upon which the miscellaneous metal work of this contract is dependent. Examine conditions at site to ensure work is fabricated to fit surrounding construction, and around obstructions and projections in place or as indicated on Drawings, or both.

3.2 FABRICATION AND ERECTION

3.2.1 Workmanship: Build and erect the work true, square, straight, plumb, accurate to sizes detailed free from defects detrimental to appearance or performance. Welding shall conform to CSA W59. Grind all exposed welds smooth.

3.2.2 Fit and assemble work in the shop, where possible.

3.2.3 Attach work with non-corrosive bolts or screws; at masonry into adhesive or expansion shields; at wood by countersunk wood screws.

3.2.4 Install work plumb, true, square, straight, level, and fitted tightly and accurately to adjacent work.

3.2.5 Insulate between dissimilar metals, or between metal and masonry or concrete with bituminous paint to prevent electrolysis.

3.2.6 Clean and refinish to remove soil and to repair prime painted finishes. Re-prime damaged prime surfaces. Remove damaged, dented, defaced, or tool marked components and replace with new.

3.2.7 Hand over items for casting into concrete or building into masonry to appropriate trades together with setting templates.

3.2.8 Hot-dip galvanize all materials to be installed exterior to the building.

3.3 PAINTING

3.3.1 Prepare surfaces, shop prime and finish paint after fabrication of miscellaneous steel items in accordance with Section 09900.

3.3.2 Do not paint steel surfaces that are to be encased in concrete.

3.3.3 Do not paint steel surfaces indicated as stainless steel finish or otherwise indicated for special finish.

END OF SECTION

1. GENERAL

1.1 DESCRIPTION

1.1.1 Comply with Section 01005 "General Requirements".

1.1.2 The work described in this Section consists of the supply and installation of rough carpentry items required in connection with the work as indicated on the drawings.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Finish Carpentry Work under Section 06400.
Gypsum Board under Section 09250.
Insulation under Section 07200.
Sheet Metal Flashing under Section 07600.

1.3 DELIVERY, STORAGE AND PROTECTION

1.3.1 Deliver, store and always protect materials and work to prevent marking, soiling and staining and the deterioration or the loss or impairment of their structural and other essential properties.

1.3.2 Keep materials under waterproof cover, in transit and at the job site. Do not store materials or finished work within areas where cement or masonry is not thoroughly dry.

2. PRODUCTS

2.1 GENERAL

2.1.1 All materials shall be straight, new, kiln dried and clean, properly sized and shaped to the correct dimensions from actual and nominal sizes as noted on the drawings.

2.1.2 Quality, dimensions and moisture content of lumber shall conform to CSA Standard 0141–1970 for Softwood Lumber and the official grading rules of the applicable grading authority for the particular species and grades. Grade mark all lumber delivered to the site.

2.1.3 Dimension Lumber: to CAN/CSA 0141-91 and CAN3-086-M84 and to National Lumber Grades Authority Standard grading Rules 1987-grade category as follows:
a) Light framing and blocking: species group spruce - "Construction" grade.

2.1.4 Plywood: to CSA 0151-M1978, Canadian Softwood Plywood
a) All Locations except Backboards: Douglas Fir to CSA 0121-M1978 Un-sanded Sheathing Grade.
b) Backboards: Canadian Softwood to CSA 0151-M1978.

2.1.5 Fasteners: nails, spikes and staples to CSA B111-1974; - hot dip galvanized steel for exterior work including components located in exterior walls and roofs; bright finish steel in all other locations. Unless otherwise indicated use common spiral flathead nails.

a) Fasteners to hollow masonry and aerated concrete panel (Siporex) use toggle bolts; to solid masonry or concrete use expansion shields, friction fit pins or lag bolts; to steel use self-tapping screws. Use lead or in-organic fibre plugs with specified screws in concrete/masonry.
b) Nails: To CSA B111-1974,
c) Bolts, Nuts, Washers: ASTM A307, hot dip galvanized steel.
d) Connectors, Anchors, Brackets, Spikes: Hot dip galvanized structural quality steel.

e) Plugs for Masonry Walls: 4.5 mm galvanized sheet steel wall plugs by Drummond & Reeves, approx. 75 mm deep and 57 mm wide.
f) Screws: To CSA B35.4-1972 zinc, cadmium or chrome plated.
g) Nailing Discs: Flat caps, minimum 1" diameter, maximum 16 ga. thick sheet metal, formed to prevent dishing. Bell or cup shapes not acceptable.

2.2 **ROUGH CARPENTRY ITEMS**

2.2.1 Sawn timber for rough carpentry work and ordinary framing shall be Standard Grade Light Framing, pine, spruce or fir conforming to NLGA grading rules.

2.3 **OTHER MATERIALS**

2.3.1 Pressure Treatment of Wood: all exterior wood to be treated in accordance with CAN/CSA-080-1-M89 and supplemented as follows:
a) Treat dimension lumber to CAN/CSA-080.2-M89 using pentachlorophenol or copper napthenate preservative to obtain a minimum net retention of 6.4 kg/m3 of wood.
b) Treat plywood to CAN/CSA-080.9-M89 using pentachlorophenol or copper napthenate preservative to obtain a minimum net retention of 4.8 kg/m3 of wood.

Surface, cut, bore and trim components to sizes required as such as possible prior to pressure treatment.

Use Type "A" Hydrocarbon Solvents to CSA 080.201-M89.

All wood to have a maximum moisture content of 15% after pressure treatment of wood.

2.3.2 Wood Preservative: copper naphthenate or pentachlorophenol base, water repellent wood preservative to CSA 080-M89, penetrating type suitable for brush or dipping application, coloured for concealed wood in contact with concrete or masonry and clear and colourless for exposed lumber, approved equal to "Pentox" by Osmose Pentox Inc.

2.3.3 Rough Hardware: bolts, nuts, washers, nails, screws, etc. shall be new, properly sized for the required application, and hot dip galvanized in accordance with ASTM A–153.

2.3.4 Nails: all nails to be long enough so that not less than half their length penetrates into the second member.

Splitting of wood members shall be minimized by staggering the nails in the direction of the grain and by keeping nails well in from the edges.

2.3.5 Plywood Sheathing: to installed with all edges supported and placed so that surface grain is perpendicular to the framing members.

Not less than 2 mm gaps shall be provided between sheets, to allow for material expansion.

All securement should have at least two nails with the nails being at least half the nail length apart and be not less than quarter of the nail length from the edge of the framing member.

3. **EXECUTION**

3.1 **EXAMINATION**

3.1.1 Examine the completed work of other trades on which the work is dependent. Immediately report discrepancies.

3.2 WORKMANSHIP

3.2.1 Execute work by persons skilled in this trade, and as shown on the drawings. Fabricate and erect the work square, plumb, straight and true to required lines and levels.

3.2.2 Accurately fit joints and intersecting members and make in true planes with adequate fastening to develop the full length of the members. Locate joints over bearing or supporting surfaces.

3.2.3 Ensure that materials are rigidly and securely attached to each other and to adjacent building elements and will not be loosened by work of other trades.

3.2.4 Where other materials and components are to be applied directly over wood members recess heads of fastening devices below wood surfaces.

3.2.5 Where work remains exposed to view, fasteners shall be uniformly and evenly spaced and neatly installed.

3.3 ROUGH CARPENTRY

3.3.1 Provide all rough carpentry items and as required for wall construction and other trades. Wood blocking, studs and similar items indicated shall not be regarded as exact or complete. Properly frame work close fit, accurately set and rigidly secured. Provide adequate fastenings and supports. Install wood blocking in drywall partitions for anchoring of counters, vanities, cupboards, railings, toilet partitions, washroom accessories, etc. Provide blocking for sheet metal work as indicated on drawings.

3.3.2 Contractor to be responsible for safe disposal of all debris from the job site.

3.3.3 Provide temporary protection, to the satisfaction of the Consultant, to render all wood blocking watertight, at sheet metal flashing work, if permanent membrane protection cannot be provided within the same day.

3.3.4 Provide wood nailers, blocking, copings, strapping, bucks, grounds and other rough carpentry components to sizes and in locations required for satisfactory supply of fabricated items and other work.

3.3.5 Unless otherwise indicated, provide minimum 38 mm thick material. Grounds may be 21 mm thick material unless otherwise indicated.

3.3.6 Install wood members plumb, level, straight, true to line and solidly anchored to adjacent building elements.

3.3.7 Provide rough bucks where indicated or required for windows, doors lockers and other elements.

3.4 PRESERVATIVE TREATMENT

3.4.1 Coat wood members in contact with concrete or masonry on all surfaces either by brush or dipping, with wood preservative. Cut all members to fit prior to installation and treat all faces and cuts with preservative. Treat wood blocking by applying full brush coat of wood preservative. Apply treatment after members are cut to size and any holes are bored, but before the members are built in.

3.5 HARDWARE AND FASTENINGS

3.5.1 Provide rough hardware including nails, screws, bolts, washers, brackets, hangers, and fastening devices of all types.

3.5.2 Size and space fastenings and anchors to adequately support the member and imposed loads.

3.5.3 Unless otherwise indicated, attach wood members at maximum 600 mm o/c. as follows:
a) To concrete and solid masonry with expansion type anchor bolts.
b) To hollow masonry with toggle bolts.
c) To heavy gauge metal with bolts.
d) To light gauge metal with screws or bolts.
e) To wood with nails, screws or bolts as required to ensure stability.

3.5.3 For sheet metal flashing work:
a) Co-ordinate location and installation of anchors and fasteners. Confirm types of fasteners to be utilized with Consultant.
b) Do not use metals in combination that will set up electrolytic action.
c) Use non-corrosive or galvanized steel fastenings, as approved by Consultant, or as otherwise specified.
e) Space anchors within load bearing or shear capacity.

3.5.4 Bucks and plates shall be anchored to masonry walls with 13 mm galvanized steel bolts 450 mm long.

3.5.5 Fasten wood copings to supporting masonry elements with 13 mm galvanized steel bolts min. 450 mm long spaced max. 600 mm o/c. Where width of coping plate exceeds 100 mm, stagger bolts off center.

3.6 **EQUIPMENT BACKBOARDS**

3.6.1 Provide backboards for mounting electrical equipment as indicated. use 19 mm thick plywood on 19 x 38 mm furring around perimeter and at maximum 300 mm intermediate spacing.

3.6.2 Size backboards to adequately accommodate equipment to be mounted. Secure boards with countersunk fasteners to supporting walls in manner which will carry equipment load without damaging wall.

END OF SECTION

Part 1 General

1.1 Section Includes

.1 Fabricated wood casework and associated wood products

.2 Countertops

.3 Cabinet hardware

.4 Preparation for installing utilities / i.e. sinks, faucets, electrical plugs and switches etc.

1.2 Related Sections

.1 Section 05500 – Metal Fabrications

.2 Section 06100 – Rough Carpentry and Wood Blocking: Grounds and support framing

.3 Section 07900 – Sealants

.4 Section 08710 – Finish Hardware: Hardware for tall cabinets

.5 Section 09900 – Painting / On-Site for finishing of misc. loose trim items, etc.

1.3 References

- ANSI A135.4 - Basic Hardboard.
- ANSI A208.1 - Mat Formed Wood Particleboard.

AWMAC (Architectural Woodwork Manufacturers Association of Canada)– Architectural Woodwork Standards / latest edition

- BHMA A156.9 - Cabinet Hardware.
- FS MMM-A-130 - Adhesive, Contact.
- CHPVA [Canadian Hardwood Plywood and Veneer Association] Canadian Standard for Hardwood and Decorative Plywood
- NEMA (National Electric Manufacturers Association) LD3 - High Pressure Decorative Laminates.
- NHLA (National Hardwood Lumber Association).

1.4 Submittals for Review

.1 Section 01300: Submittal Procedures.

.2 Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.

.3 Product Data: Provide data for hardware accessories.

.4 Casework samples: Submit two 300 x 300 mm size samples, illustrating cabinet finish / wood species, core and finish as specified within.

.5 Counter-top samples: Submit two 300 x 300 mm size samples, illustrating typical countertop finish and specified core.

.6 Hardware samples: Submit two samples of pulls, hinges, drawer slides and shelf clips illustrating hardware finish.

1.5 Quality Assurance

1. Perform work in accordance with AWMAC Custom grade.
2. Work of this section shall be completed by a member of AWMAC, with 5 years' experience in finish carpentry and work comparable complexity and scope. Submit proof of experience upon Owner / Consultant's request.
3. Fabricate finish carpentry work in accordance with AWS quality standards, premium quality materials and installation unless otherwise indicated. Perform work in accordance with the definition of good workmanship as defined in the AWS quality standards.
4. Remove and replace finish carpentry work which does not conform to the AWS quality standards or as amended by these specifications.

1.6 Warranty

.1 At no cost to the owner, repair any defects in the work of this Section due to delaminating or warping for a period of two years from date of Substantial Performance

.2 ***If requested by the owner***, a certified inspector approved by the local AWMAC chapter must be retained for an inspection for work of this section.

1.7 Mock-Up

.1 Mock-up Requirements.

.2 If requested by the owner. provide mock-up of typical full size storage cabinet.

.3 Accepted Mock-up may remain as part of the Work.

1.8 Pre-installation Meeting

.1 Section 01300: Administrative Requirements – Project Meetings.

.2 Convene minimum 4 weeks prior commencing installation of this section.

1.9 Delivery, Storage, and Protection

.1 Section 01600: Product Delivery Requirements.

.2 Protect units from moisture damage.

.3 Product Storage and Handling Requirements.

.4 During and after installation of work of this section, maintain the same temperature and humidity conditions in building spaces as will occur after occupancy. General Contractor to co-ordinate

Part 2 Products

2.1 Wood Materials

.1 Softwood Lumber: Graded in accordance with AWMAC Custom grade; average moisture content of 8 percent.

.2 Hardwood Lumber: NHLA; graded in accordance with AWMAC Custom grade; average moisture content of 8 percent; species and grade as follows:

.1 Species – Select Maple

2.2 Panel Materials

.1 Hardwood Plywood: in accordance with CHPVA and graded to AWMAC standards; cores for plywood as noted under Fabrication. Hardwood Plywood to be laminated with a soy- based adhesive containing no urea-formaldehyde / species and grades as follows:

.1 Exposed Parts: Species - Select Rotary Cut White Maple, Grade - A White

.2 Semi – Exposed Parts: Species - Select Rotary Cut White Maple, Grade – B White

.2 Particleboard Core: [ANSI A208.1;] AWMAC standard, manufactured to meet NAUF standards

.3 Veneer core: in accordance with CHPVA and AWMAC, manufactured to meet NAUF standards

2.3 Plastic Laminate

.1 Acceptable Suppliers:

.1 Formica
.2 Wilsonart
.3 Arborite

Note: All colours and finishes to be selected from manufacturer's standard colour range

2.4 Laminate Materials

1 Plastic Laminate: NEMA LD 3, PF 42 Post Forming Grade.

2 Laminate Backing Sheet: 0.020 inch Backing Sheet grade, undecorated plastic laminate.

2.5 Cabinet Hardware

.1 **19mm Door Hinges:** Blum Press–In 170 degree self-close full overlay. Hinges to be provided with factory installed knock in dowels. For quantity of hinges required per door, refer to hinge manufacturer's manual. Wood screw fastening system will not be accepted.

.2 **19mm Door Hinge Plates**: One piece plate with min. 3mm height adjustment. Hinge plates to be installed using pre-mounted system screws. Wood screw fastening system will not be accepted.

.3 **19 mm Door Dampener**: Blumotion 971A with Cruciform Base [or slice equivalent] required for all 19mm doors to allow for soft closing.

.4 **19mm Bumpers**: Polyurethane 3mm high X 10mm diameter / minimum 2 per door and drawer front.

.5 **Shelf Standards and Clips**: KV 255 pilaster and KV 256 clip – satin nickel finish Note: Pilasters to be fully recessed into gables.

.6 **Drawer and Door Pulls**: Stainless Steel D- Pull / 8mm diameter X 96mm centres - c/w with 8/32 machine screws.

.7 **Cabinet Locks for 19mm doors and drawers**: National Disc Tumbler Cylinder Cam Lock C8080 Series c/w cam to suit / chrome finish. All cabinets to be locked with the exception at sink locations. All locks shall be keyed alike per room and master keyed.

.8 **Cabinet Locks for 45mm doors**: supplied by Section 08710 Door Hardware. Note: this section to prepare doors and components to receive specified model.

.9 **Elbow catches**: Richelieu Heavy Duty Elbow Catch # 5540180 / nickel finish / required at all two door units

.10 **Drawer Slides**: Accuride 45 kg [100 lb.] # 3832EC X length to suit with Easy Close feature [soft closing]. Finish C – Clear electroplate

.11 **45mm Door Flush Bolts** - Onward 392C

.12 **45mm Door Hinges**: Stanley CB179, 76 x 76 or Hager 1279, 76 x 76

.13 **Coat Rods and Flanges (**all heavy-duty): Richelieu # 4911672CV and 49116CFCV

2.6 Edge-banding

.1 All exposed edges to be banded with 3mm hardwood edging as follows:

.1 The 3mm hardwood edging to be a multilayered natural timber made from multiple layers of 0.6mm veneer laminated together with PVA glue [which does not contain any hazardous ingredients and has no harmful effect on health or the environment.

.2 Final assembly of the 3mm hardwood edging to be surface sanded to 180 grit and roughly sanded on the reverse side for good adhesion.

.3 The top layer of the 3mm hardwood edging to have continuous high-quality veneer to match hardwood plywood with minimal color variation.

.4 All layers of the 3mm hardwood edging to have asymmetrical finger joints.

.5 In order to provide proper adhesion, all 3mm hardwood edging to be stored in a controlled humidified environment prior application.

2.7 Whiteboard horizontal Sliders

.1 Supply and install all associated whiteboard horizontal sliders as follow:

.1 Type 10D double horizontal slider
.2 Include all devises for a complete and finish work.
.3 Manufacturer Global School Products.

2.8 Fabrication

.1 General Notes:

.1 Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.

.2 Fabricate each module to be self-supporting with both exterior gables finished to allow removal and relocation without any alteration to casework.

.3 Fit all exposed edges with 3.0 mm matching hardwood edging. Use one piece for full length only.

.4 Cap exposed plastic laminate finish with edges of same finish and pattern.

.5 Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Locate counter butt joints minimum 600mm from sink cut-outs.

.6 Toe Base Height: Unless otherwise noted, provide 100mm high toe space at front and 25mm inset at finished ends to accept finish base by flooring contractor.

.2 Manufactured Units

.1 Fabricate casework as governed by AWMAC custom quality grade and to details and sizes as indicated

.2 Casework to be built using full overlay doors and drawer fronts

.3 Casework to be fabricated using frameless system

.4 Casework Bodies: 19mm thick veneer core hardwood plywood

.5 Casework Backs: 6mm hardwood plywood rabbeted into top, bottom and gables. Backs to be reinforced with min. 12mm nailer strip X 75mm wide at top and bottom of cabinet to allow for secure installation

.6 Casework Shelving: for spans of up to 900mm, use 19mm thick veneer core hardwood plywood c/w edge banding at front edge only. For spans greater than 900mm and less than 1200mm, use 25mm thick veneer core hardwood plywood. Spans greater than 1200mm to be supported by intermediate gable

.7 Casework Doors and Drawer Fronts: 19mm thick particleboard core plywood.

.8 Drawer Boxes: front, back, sides and bottom to be built using 12mm hardwood plywood. Exposed edges to have minimum .6mm matching veneer edge banding applied.

.9 Counter-tops: Post formed plastic laminate on 19mm particle board with balanced backer sheet applied / Post formed profile to be D-shaped

.10 Toe Kicks: 19mm exterior grade veneer core plywood / 100mm high toe space at cabinet front and 75mm inset at finished ends to accept finish base by flooring contractor.

.11 Tall Storage Units: units to be fabricated using 45mm solid core wood doors with matching

hardwood stiles. Doors to be installed on 38mm X45mm solid hardwood rails / rails to be rabbeted and glued to gables

2.9 Factory Finishing

.1 All casework to be shop finished for clear finish
.2 Topcoat to be pre or post catalyzed lacquer
.3 Casework to be finished as per AWMAC System Coating Schedule /Systems 2 and 3, Lacquer, Pre and Post Catalyzed

3.1 Execution

.1 Examination

.1 Existing conditions.

.2 Verify existing conditions before starting work.

.3 Verify adequacy of backing and support framing.

.4 Verify location and sizes of utility rough-in associated with work of this section.

3.2 Installation

.1 Comply with AWMAC (Architectural Woodwork Manufacturers Association of Canada) – Architectural Woodwork Standards / latest edition

.2 Install cabinetwork components plumb, true and level and securely fasten in place. Accurately scribe and closely fit components to irregularities of adjacent surfaces.

.3 Accurately fit joints in true plane, locate joints over bearing or supporting surfaces.

.4 Provide mechanical fastening devices such as nails, screws and bolts required for fastening wood components. Unless permitted provide concealed fastening of components.

.5 Install plastic laminate components using concealed fastening devices.

.6 Where trim components are fastened with screws or bolts, countersink screw and bolt heads and provide wood plugs matching surrounding wood.

.7 Prepare work of this Section to receive services, fittings and fixtures provided by Division 15 and 16.

.8 Provide grommets where shown and at all locations where power / data / telephone outlets are located below counters / worktables.

.9 Where access is required to valves and other mechanical and electrical components, located behind cabinetwork, provide removable plywood access panels of size required.

.10 Check operation of all movable parts and, if necessary, adjust to ensure proper and smooth function.

.11 Adjust all gapping at cabinet doors and drawer fronts to comply with AWMAC standards.

.12 When necessary, to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

.13 Upon completion of installation, inspect work of this section and touch up, where required, minor or damaged surface finish to restore it to original condition. Replace damaged components which, in the opinion of the Consultant, cannot be satisfactorily repaired.

3.3 Adjusting

.1 Installation

.2 Test installed work for rigidity and ability to support loads.

.3 Adjust moving or operating parts to function smoothly and correctly.

3.4 Cleaning

.1 Cleaning

.2 Clean casework, counters, shelves, hardware, fittings, and fixtures.

3.6 **EXTENT OF WORK**

3.6.1 Millwork shall include, but is not limited to, the following work:

- **as indicated / detailed on drawings.**

END OF SECTION

1. GENERAL

1.1 WORK INCLUDED

1.1.1 This section specifies requirements for the repairs on the roofs indicated on the drawings.
General contractor to retain the companies holding the warranties to perform any work on the existing roofs.

1.2 RELATED WORK

General Requirements	Section 01005
Metal Flashing	Section 07610
Sealant	Section 07900

1.3 QUALITY ASSURANCE

1.3.1 Work on this section is to be conducted only by individuals specifically trained and qualified for this work.

1.3.2 Provide one thoroughly experienced, reliable, qualified and competent person in charge of the Work and present on site at all times.

1.4 REFERENCE STANDARDS

1.4.1 Abbreviations:
CSSBI - Canadian Sheet Steel Building Institute
CSA - Canadian Standards Association
CGSB - Canadian General Standards Board
ASTM - American Society for Testing and Materials
CRCA - Canadian Roofing Contractors Association
NBC - National Building Code,
OBC - Ontario Building Code (OBC latest edition) and Municipal Building Code
ULC & FM - Underwriters' Laboratories of Canada and Factory Mutual
ASHRAE - American Society of Heating, Refrigerating and Air- Conditioning Consultants

1.5 EXISTING ROOFS UNDER WARRANTY

1.5.1 PVC roof over the shops.

Single-ply PVC roof membrane assembly consisting of the following components:

Roof Assembly - Valleys	**Roof Assembly - Slopes and Peaks**
▮ New 60mil (1.5mm) PVC membrane, fully adhered with membrane adhesive and hot-air welded seams;	▮ New 60mil (1.5mm) PVC membrane, fully adhered with membrane adhesive and hot-air welded seams;
▮ New 1/2" exterior sheathing board, adhered;	▮ New 1/2” exterior sheathing board, adhered;
▮ New tapered polyisocyanurate insulation (1% slope), adhered;	▮ N/A
▮ New 1” polyisocyanurate insulation, adhered;	▮ Two layers of 2” polyisocyanurate Insulation, adhered;
▮ New self-adhered air & vapour barrier membrane;	▮ New self-adhered air & vapour barrier membrane;
▮ New 1/2” exterior sheathing board, mechanically fastened;	▮ New 1/2” exterior sheathing board, mechanically fastened;
▮ Existing steel deck	▮ Existing steel deck

15-year Sika warranty installed by Bothwell-Accurate.
Bothwell Accurate email – info@baroof.com

1.5.2 Flat Roof over existing Drama Room

Roof assembly

- Flood coat and gravel
- Hot-applied Asphaltic Built -Up Roof membrane.
- ½" Asphalt impregnated board, adhered.
- 2" polyisocyanurate insulation, adhered.
- Shelf adhered air & Vapour barrier membrane.
- 5/8" exterior sheathing board adhered.
- Steel deck

25-year Soprema hot applied roof system installed by Solar Roofing.
Solar Roofing email – solarroofing@bellnet.ca

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

.1 Labour, Products, equipment and services necessary for firestopping and smoke seals Work in accordance with the Contract Documents.

1.2 **REFERENCES**

.1 ASTM E814, Test Method for Fire Tests of Through-Penetration Fire Stops.

.2 CAN/CGSB 19.13, Sealing Compound, One Component, Elastomeric, Chemical Curing.

.3 CAN/ULC S102, Surface Burning Characteristics of Building Materials and Assemblies.

.4 CAN/ULC S115, Standard Method of Fire Tests of Firestop Systems.

.5 CAN/ULC S702, Thermal Insulation, Mineral Fibre for Buildings.

1.3 **SUBMITTALS**

.1 Product data:

.1 Submit copies of manufacturer's Product data in accordance with the Conditions of the Contract indicating:

.1 Performance criteria, compliance with appropriate reference standard, characteristics, limitations.

.2 Product transportation, storage, handling and installation requirements.

.3 Submit firestop and smoke seal manufacturer's Product data for materials and prefabricated devices, including manufacturer's printed installation instructions.

.2 Shop drawings:

.1 Submit shop drawings in accordance with the Conditions of the Contract indicating:

.1 Fire rated and smoke sealed systems for each typical application.

.2 Construction details, accurately reflecting actual job conditions.

.3 ULC or Intertek Testing assembly listing.

.3 Certification:

.1 Submit certified documentation from manufacturer for each worker performing Work of this Section.

.2 Submit installer's and Product manufacturer's certification verifying compliance with the Contract Documents and conformance with ASTM E814 and CAN/ULC S115.

1.4 **QUALITY ASSURANCE**

.1 Perform Work of this Section by manufacturer-approved, skilled, qualified, and experienced workers trained in installation of Work of this Section.

1.5 **SITE CONDITIONS**

.1 Conform to manufacturer's requirements and maintain a minimum temperature of 5 °C for a minimum period of 24 h before application, during, and until application is fully cured.

.2 Maintain sealant at a minimum 18° C for best workability.

2 Products

2.1 **ACCEPTABLE MANUFACTURERS**

.1 Acceptable manufacturers of rated systems include:
- .1 AD Fire Protection Systems Inc.
- .2 Hilti Canada Corporation.
- .3 3M Canada Inc.
- .4 Tremco Ltd.

2.2 **MATERIALS**

.1 All materials under Work of this Section, including but not limited to, primers and sealants are to have low VOC content limits.

.2 Firestop sealant: single component, low modulus, silicone rubber, moisture curing, ULC labelled to CAN/CGSB 19.13-M and CAN/ULC S115.

.3 Firestop insulation: to CAN/ULC-S702, Type 2; mineral fibre manufactured from rock or slag, suitable for manual application.
- .1 Density: 81 kg/m^3 when tested to ASTM C303.
- .2 Combustibility: Noncombustible to CAN/ULC S114.
- .3 Melt temperature: >1175 degrees C.
- .4 Surface burning characteristics: to CAN/ULC S102, maximum flame spread of 0, smoke developed of 0.
- .5 Moisture Absorption: 0.04 percent when tested to ASTM C1104.
- .6 Smoulder Resistance: 0.01 percent when tested to CAN/ULC S129.

.4 Damming, back-up, supports, and anchorage: In accordance with manufacturer's fire rated systems and to acceptance of authorities having jurisdiction.

.5 Primer: As recommended by firestop sealant manufacturer.

2.3 **SYSTEMS**

.1 Firestopping and smoke seals: ULC or Intertek Testing Services listed Products and systems in accordance with CAN/ULC S115 suitable to actual application and installation conditions.

.2 Do not use Products containing asbestos.

.3 Firestopping components shall not contain volatile solvents or require special application to protect plastic pipe from firestopping compound.

3 Execution

3.1 **EXAMINATION**

.1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of Work means acceptance of existing conditions.

.2 Verify that substrates and surfaces to receive firestopping and smoke seals are clean, dry, and frost free.

3.2 **FIRESTOP AND SMOKE SEAL LOCATIONS AND RATINGS**

.1 Install ULC firestop and smoke seal systems rated to match fire resistance design rating of assemblies into which they are installed.

.2 Install firestop and smoke seal systems. Use systems with required ratings at following typical locations, including but not limited to:

- .1 Gaps at intersections of fire-resistance rated masonry and gypsum board partitions.
- .2 Control and sway joints in fire-resistance rated walls and partitions such as masonry and gypsum board.
- .3 Gaps at top of fire-resistance rated partitions such as masonry and gypsum board partitions.
- .4 Penetrations through fire-resistance rated walls and partitions including mechanical and electrical services and openings and sleeves for future use.
- .5 Penetrations through fire-resistance rated floor slabs, ceilings, and roofs.
- .6 Perimeter of retaining angles on rigid ducts greater than 0.012 m^2, firestopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.
- .7 At top of walls between rooms and at top of walls at corridors. Typical.

3.3 **PREPARATION**

.1 Prepare, modify, and adjust void sizes, proportions, and conditions to conform to fire rated and smoke sealed assembly requirements such as assembly opening size and dimensional restrictions.

.2 Mask adjacent surfaces to avoid spillage and over-coating of adjacent surfaces. Remove stains from adjacent surfaces.

3.4 **INSTALLATION**

.1 Install firestopping and smoke seal systems in accordance with manufacturer's instructions and fire rated assembly to establish continuity and integrity of fire separations.

.2 Install firestop insulation in compacted thicknesses required by ULC design. Compress insulation approximately 50 percent.

.3 Install primers as recommended by firestop and smoke seal Product manufacturers.

.4 Install temporary forming, damming, back-up as required, remove after materials have achieved initial cure and will resist displacement.

.5 Install firestop and smoke seal filler in horizontal joints providing 25% compression fit.

.6 Use resilient, elastomeric firestopping and smoke seal systems in following locations:
- .1 Openings and sleeves for future use.
- .2 Penetration systems subject to vibration or thermal movement.
- .3 Penetration systems in acoustical containment enclosures.

.7 Trowel and tool exposed firestop and smoke seal Product surfaces to uniform, smooth finish.

.8 Repair damaged firestopped and smoke sealed surfaces to acceptance of Consultant.

.9 Identify each firestop and smoke seal penetration assembly with permanent label listing following:
- .1 Assembly and rating in hours.
- .2 Date of installation.
- .3 Installing company's name and telephone number.

.10 Do not cover materials until full cure has taken place.

3.5 **CLEAN-UP**

.1 Remove excess materials and debris and clean adjacent surfaces immediately after application.

END OF SECTION

1. GENERAL

1.1 DESCRIPTION

1.1.1 Comply with Section 01005 "General Requirements".

1.1.2 The work described in this Section consists of the supply and installation of caulking components to seal:
a) Door and window framing perimeters.
b) Joints.
c) Miscellaneous construction voids.

1.1.3 Applied sealants shall be non-sag elastomeric material providing flexible, durable weather tight seals, free of adhesive and cohesive failure, for all types of construction joints.

1.1.4 Proceed with caulking only when air, substrate, and material temperatures are above minimum established by manufacturer's specifications, and surfaces in contact with sealant are completely dry.

1.1.5 Manufacturer's technical representative to be on site for approval of surface preparation prior to application of product, and review of completed installation. Manufacturer's representative to provide report to the Owner and Architect.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Miscellaneous Metalwork under Section 05500.
Doors and Frames under Section 08100.

1.3 WARRANTY AND SUBMISSIONS

1.3.1 The work of this section shall be warranted against failure or defects of materials and application as follows:
a) Exterior caulking work – 4 year written warranty.
b) Interior caulking work – 2 year written warranty.

These warranties shall commence upon accepted Substantial Completion of the work.

1.3.2 Repair or replace all defective material and workmanship at no expense to the Board. This warranty includes other materials damaged by this trade or which might become damaged due to failure of caulking during the warranty period.

1.3.3 Examine drawings, details and specifications prior to tendering to ensure that the materials and joint details will satisfy the conditions of the warranty. Submission of tender and commencement of work shall imply an unqualified warranty. All joints required to be larger than 1” must be pre-approved by the Consultant with submission of adjacent materials manufacturer stating why wide joint required. Submit per Section 01340.

1.4 DELIVERY, STORAGE AND HANDLING

1.4.1 Deliver and store materials in manufacturer's original packaging, with labels intact. Store in weatherproof sheds, warmed as necessary. Protect volatile and inflammable materials from direct sources of heat, open flame and sparks.

2. PRODUCTS

2.1 SEALANTS

2.1.1 Colours of sealant, to the approval of the architect, and matching the predominant material to which sealant is applied.

2.1.2 Primers are to be type recommended by sealant manufacturer, for the appropriate sealant and corresponding substrate.

2.1.3 Joint backing material shall be compatible with primers, sealants, outsize 30%, polyethylene, extruded closed cell foam, Shore "A" hardness 20, tensile strength 20-30 psi.

2.1.4 Bond breaker, where joint configuration does not allow for proper depth/width ration with the use of backer rod (see Section 3.2.5) a pressure sensitive plastic tape such as 3M #226 or #481 shall be placed at the back of the joint which will not bond to the sealant.

2.1.5 Sealant

TYPE 1 *Multi-Component, Polyepoxide Urethane Sealant* To meet specified requirements of CGSB specification 19-GP-24M; Dymeric, as manufactured by Tremco (Canada) Ltd.

Use at all locations, except where another type is specified. Unless otherwise approved, use only the one selected type of sealant throughout.

TYPE 2 *Acrylic Solvent Release, One Part Sealant* To meet specified requirements of CGSB specification 19-GP-5M, such as Tremco 555 Sealant by Tremco. Use at interior joints between windows, door frames and screen frames.

TYPE 3 *Silicone Sealant, One Part Sealant* To meet specified requirements of CGSB specification 19-GP-9Ma, such as Proglaze by Tremco (Canada) Ltd. Sealant for fixtures and vanity tops, mildew resistant.

TYPE 4 *Expanding Foam Sealant - Expansion Joints* by Emseal Joint Systems, Ltd.
SecuritySeal SSW2 features dual-sided, pick resistant, hardened flexible polyurethane sealing surfaces adhered to a fire-retardant impregnated foam backing. Both sides of the expansion joint are waterproof and fire-rated.
One product, One Install Does It All–fire-rated, watertight, airtight, 100% movement, quiet, non-invasive anchoring, UL 2079 Certified.

Uses: Schools, daycare centers, etc., Interior and exterior walls.

Colour: Tru-White, Limestone

TYPE 5 *Sealant for Exterior Paving Slabs and Horizontal Traffic Joints* THC-900 Hyrbrid Polyurethane by Tremco (Canada) Ltd.

2.1.6 Acoustical sealant for concealed perimeter joints and openings in drywall systems shall be by Tremco Ltd., or approved equal, conforming to CAN/CGSB–19.21–M87.

2.1.7 Sealants for control joints and expansion joints in ceramic tile floors to be caulked with "Duoflex S.L." by Sternson.

2.1.8 Cleaning material for surfaces to receive sealant Xylol, Methylethylketone, Toluol, or as recommended by the manufacturer of sealant.

2.2 **RELATED MATERIALS**

2.2.1 Backup material: of bond–breaking, non–absorbent, closed cell, round cross section polyethylene, neoprene, urethane, or vinyl as supplied or recommended by caulking manufacturer. Backup size shall be 30% larger than joint width.

2.2.2 Tape where required as bond breaker shall be polyethylene which will not bond to caulking material.

2.2.3 Thinners, cleaners, surface conditioner or primer: type supplied or recommended by the caulking manufacturer for the application and purpose served.

3. EXECUTION

3.1 PREPARATION

3.1.1 Ambient and surface temperatures to be within a range of 5^0C to 30^0C. Provide heated enclosures when necessary to maintain temperatures above the minimum limit.

3.1.2 Surfaces of materials to be caulked are to be firm, free from dirt, water, frost, oil, grease and foreign matter which will impede adhesion of the caulking material. Use oil–free solvent recommended by caulking manufacturer to clean surfaces.

3.1.3 Allow masonry mortar to fully cure and dry a minimum of two weeks before caulking joints in masonry.

3.1.4 Examine joint sizes and correct to achieve proper width/depth ratio.
1/4" x 1/4" min. joint size.
1/4" x 1/2" depth shall equal width.
1/2" to 1" depth shall equal half of width.
1" to 2" max. sealant depth to be 1/2" (note: joints required to be larger than 1” must be approved by the Consultant with submission of adjacent materials manufacturer stating why wide joint required. Submit per Section 01340). For joints wider than 2", the sealant manufacturer's representative shall be contacted.

3.2 WORKMANSHIP

3.2.1 Carry out work by persons proficient in the use of materials specified neatly and carefully to ensure full adhesion. Work to be in accordance with the material manufacturer's instructions.

3.3 APPLICATION

3.3.1 Prime joints with surface conditioner, apply in accordance with caulking manufacturer's instructions. Allow primer to cure.

3.3.1 Apply sealant backer wherever necessary to provide correct joint depth.

3.3.2 Where possible, conceal caulking flush. Where caulking is required to be recessed as shown on the drawings, the recess to be 3 mm. to 6 mm. Apply caulking with pressure gun fitted with a suitable nozzle. Ensure that an excess of the sealant is always pushed ahead of the nozzle and forced into the joint. The cured sealant to be free from ridges, wrinkles, air pockets and imbedded foreign matter and have a slightly concave surface.

3.4 FINISHED APPEARANCE

3.4.1 Present a neat finish with clean lines, without staining, sagging, excess, splatter or drips at the joint or on adjacent work.

3.5 CLEAN–UP

3.5.1 Remove droppings of excess caulking using recommended cleaners, and clean surfaces immediately. Ensure surplus material is not permitted to set hard before removal.

END OF SECTION

1. GENERAL

1.1 The work of this section consists of the supply and installation of interior hollow metal doors and frames and installation of hardware. *Door System includes insulated door, frame, sounds seals, hinge and threshold to meet the minimum sound transmission of* ***STC 50***

1.2 SHOP DRAWINGS AND MEASUREMENTS

1.2.1 Provide shop drawings for all hollow metal work within 3 weeks of acceptance of Tender.

1.2.2 Shop drawings are to be produced by the manufacturer or distributor of the hollow metal work.

1.2.3 All shop drawings are to reflect actual site conditions and are to be produced as a result of a thorough site investigation. Shop drawings that do not reflect the presence of site obtained information will be immediately rejected. Shop drawings are to be site checked and stamped approval by the general contractor before accepted for review by the consultant.

1.2.4 Shop drawings will be reviewed only by the consultant. Drawings stamped, reviewed, and returned do not indicate approval of such drawings. It is the contractor's responsibility to provide all materials indicated in sizes and shapes as indicated and made to fit all possible site conditions.

1.2.5 If at any time the consultant or Board representative indicates that the item supplied does not fit or suit site conditions, then the item is to be rebuilt or re-supplied meeting those site conditions at no extra cost to the Board whether or not the item was reviewed under shop drawing review.

1.3 DELIVERY AND STORAGE

1.3.1 The subcontractor is responsible for the safe delivery and off-loading on the site.

1.3.2 Where interior site storage is permitted by the Board, the doors and frames shall be immediately placed inside out of the weather. *DO NOT STORE FRAMES OUTSIDE.* If the Board inspector finds doors and frames stored outside, they will be rejected by the Board and new doors and frames will be supplied at no extra cost to the Board. Where large screens are required on site, do not deliver until ready to install.

1.4 CODES AND REGULATIONS

1.4.1 Construct labeled doors and frames in accordance with ULC, UL, Warnock Hersey or other approved agencies as well as sound transmissions requirements.

1.4.2 Work shall comply with regulations of Canadian Board of Fire Underwriters and with requirements of such other authorities as may have jurisdiction. Requirements of such authorities relative to construction, materials and devices not specifically mentioned or shown on drawings, shall be provided in their entirety.

1.4.3 Frames for labeled doors shall be labeled by the same agency and shall be fitted with labeled hardware.

2. PRODUCTS

2.1 GENERAL

2.1.1 Provide flush slab doors as indicated on the Door Schedule and Drawings, typically 44 mm thick of 18 gauge cold rolled or stretcher leveled steel with honeycomb core. Tops and bottoms to be tack welded side seams to be tack welded and filled. ***Minimum STC 50 for the system****.* Finish in light grey rust resistant primer.

2.2 ACCEPTABLE MANUFACTURERS

Manufacturer firms with proven ability to meet or exceed this specifications.

2.3 **MATERIALS**

2.3.1 Doors and frames shall be manufactured by a firm that has been manufacturing hollow metal doors and frames under the present day name for the last 5 years.

2.3.2 Steel shall be free from scale or rust.
Interior doors shall be fabricated of 2 sheets of not less than 18 ga galvanized steel, insulated and sound deadened with pre-expanded small cell honeycomb core, completely filling the inside of doors and laminated to the inside faces of panels with ULC or Warnock Hersey approved adhesive.
Ensure that the door will meet the sound transmission STC 50 as a minimum requirement.

2.3.3 Frames shall be fabricated of 16 gauge-galvanized steel. Minimum sound transmission STC rating 55

2.3.4 Doors and frames shall be "wipe coated" or "satin coated" with a minimum coating weight of 0.25 oz./sq.ft., as defined by ASTM A90 or prime painted with one heavy coat of rust inhibitive paint.

2.3.5 All material shall be free from paint sags and runs.

2.3.6 Reinforcing for hardware shall be welded in place and consisting of the following thicknesses:

Mortise locksets and deadlocks	12 gauge thick
Bored or cylindrical locks	12 "
Surface mounted closers	16 "
Surface and panic devices	16 "

2.3.7 Hinge Reinforcement Provide 10 ga high frequency angled hinge plate reinforcing projection welded for strength and durability. On door across corridor, stairwell door and exit doors, install 3 high frequency angled hinge plates on each door and on each frame location. On all other doors and frames install on top of door and frame only.

2.3.8 Provide a minimum of 2 rubber or plastic bumpers at strike jamb of single swing doors and 4 bumpers in head members at pairs of doors.

2.3.9 Core material of labeled doors shall conform to UL, ULC, Warnock Hersey or other approved agency regulations.

3. **EXECUTION**

3.1 **FABRICATION**

3.1.1 Fabricate in accordance with profiles detailed and approved shop drawings.

3.1.2 Flat work shall be leveled and straight with surfaces smooth and true. Edges, angles and corners shall be square and clean. After welding, units shall be made square and true, free from distortion and wind. Maximum door deformation (bow, cup, twist, warp, wind) in doors shall be 0.125" measured on diagonal of door.

3.1.3 Interior door face sheets shall be connected by a continuous interlocking edge seam and welded at 6" o/c. and above and below each cut out. Edges shall be filled with body filler and ground smooth.

3.1.4 Doors shall have top cap forming a sound seal on all edges and shall not interfere with closers or stays.

3.1.6 Welds shall be made without spatter, cleaned off and dressed flush with base metal surfaces. Resistance welding shall comply with American Welding Society Ci.1 "Recommended Practices for Resistance Welding", latest edition.

3.1.7 Fill seams, depressions and intersection corners completely with epoxy filler and sand smooth.

3.1.8 Mitres shall be accurately cut, welded and sanded or ground smooth. All fastening shall be concealed.

NOTE: TOP FRAME CORNERS SHALL BE MITRED AND ALL RETURNS AND REBATES SHALL BE CONTINUOUS.

3.1.9 All members used for construction of screens are to have same frame depth. all intersections are to be neatly joined, welded and sanded smooth.

3.1.10 The work shall be reinforced to produce absolute stiffness and rigidity and to resist all stresses of normal operation. Doors and frames shall be blanked, reinforced, drilled and tapped to receive template hardware.

3.1.11 Extend frames to finished floor line and provide removable metal spreader. Supply 6 loose anchors per door frame to suit site conditions, except as specifically required on labeled doors/frames.

3.1.12 Anchors for labeled doors shall conform with ULC, UL or Warnock Hersey regulations for thickness of material, spacing and anchorage methods.

3.1.13 Touch up welds on galvanized steel with aluminum oxide paint.

3.1.14 All frames that butt up to existing masonry surfaces shall be set up for an existing masonry condition with dimples and secured with 3/8" dia. screw anchor at 2'-0" on center minimum. Fill depressions with body filler and sand smooth. 2" bottom rails shall be secured in the same manner.

3.1.18 No visible seams are permitted on door or vertical edge. Close bottom and top of door with recessed channel and flush end enclosure caps.

3.1.20 **STC Rating** Interior hollow metal doors and frame not less than 50.

3.1.21 Frame Installation

a) Install frames plumb and level. Secure to floor construction with minimum two fasteners at each jamb. Secure jambs with expansion units, at locations where frames cannot be built-in. Depress fastening device and fill with metal paste filler, grind smooth and patch primer.

b) Provide anchorage and connections to adjacent construction.

c) Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at center of head for openings over 48" wide. Remove temporary spreaders after frames are built-in. Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.

3.1.22 All anchor plates for frames and screens are to be totally hidden when frame or screen is installed.

3.1.23 Unless otherwise noted, panels in lieu of glass shall consist of 18 ga galvanized sheet steel laminated both sides to 3/4" waterproof plywood. Where fire rated, 3/8" cement board in lieu of plywood. On exterior screens, position panels on exterior side of frame.

3.2 **GENERAL FINISHING**

3.2.1 Finish painting of metal doors and frames is specified in Section 09900.

3.2.2 Replace doors in which the bond between the core and face sheet has failed.

3.2.3 Sizes as per door schedule and drawings.

3.2.4 For hardware specifications and preparation refer to Section 08710.

3.2.5 Install hollow metal doors, complete with hinges supplied under the work of Section 08710.

3.2.6 Adjust doors to swing easily and freely and to close tightly and evenly on frames without binding.

3.3 **IDENTIFICATION TAG INSTALLATION**

3.3.1 Supply and install a door tag identification number on every new and altered door frame. Where possible, existing tags are to be revised. New tags are to match existing in size, shape and number stamping. The numbers are to follow the existing numbering system. If in doubt ask inspector for actual number to be stamped. Secure tags to frames as per existing tags. Tags to be applied to all rated doors, frames and screens.

END OF SECTION

1. GENERAL

1.1 DESCRIPTION

1.1.1 The work described in this section is for the supply, installation and inspection of Finish Hardware.

For continuity and ready reference, this section includes Hardware Supply, Installation and Inspection, which in total will involve more than one contractor, as described following. The General Contractor will ensure in submitting his tender that specific roles and scope delineations are clear.

a) Hardware Supply:
It is the intention of this Section that Installation is by a specialist hardware supplier as pre-qualified herein for the following scope:

i) Supply only of door hardware for interior steel doors.

ii) Supervision of door hardware installation (Hardware Specialist).

b) Hardware Installation: It is the intention of this section that Installation is by the General Contractor if so qualified or qualified personnel appointed by the General Contractor for all systems and methods described herein.
i) Scope: Installation of door hardware for all interior and exterior steel doors.
ii) Receipt and installation of door lock cylinders and cores as supplied by the Owner.

c) Hardware Inspection: It is the intention of this section that Installation is by the General Contractor for all systems and methods described herein.
i) Scope: inspection of installation of door hardware.

1.1.2 Finishing Hardware specified in this Section to include all cylinder locks required for doors and all door hardware.

1.1.3 Preparation of final Hardware List(s), deficiency / adjustment checklist(s), etc., to co-ordinate the components supplied and to facilitate proper installation and adjustment.

1.1.4 Supply of all hardware templates and/or instructions required for proper preparation/fabrication of doors and frames at point of manufacture.

1.1.5 Supply of all hardware templates and/or instructions for installation of finish hardware on the jobsite.

1.1.6 Label hardware packages to describe contents, location for installation and hardware list and opening numbers where applicable.

1.2 RELATED SECTIONS

Steel Doors and Frames - Section 08100

1.3 REFERENCE STANDARDS

Canadian Steel Door and Frame Manufacturers Association (CSDFMA), Canadian Metric Guide for Steel Doors and Frames (Modular Construction) - latest edition.
CAN/CGSB-69.17-M86/ANSI/BHMA-A 156.2-1989, Bored and Preassembled Locks and Latches.
CAN/CGSB-69.18-M90/ANSI/BHMA-A 156.1-1988, Butts and Hinges.
CAN/CGSB-69.19-M93/ANSI/BHMA-A 156.3-1994, Exit Devices.
CAN/CGSB-69.20-M90/ANSI/BHMA-A 156.4-1992, Door Controls - Closers.
CAN/CGSB-69.29-93/ANSI/BHMA-A156-13-1993 – Mortise Locks & Latches
CAN/CGSB-69.34-m93/ANSI/BHMA-A 156.18-1993, Hardware-Materials and Finishes.

NFPA 80, Fire Doors and Windows, LATEST EDITION: Hardware in fire rated openings.
Canadian Steel Door & Frame Manufacturers Association (CSDFMA),
Canadian Metric Guide for Steel Doors & Frames (Modular Construction)

1.4 **REQUIREMENTS OF REGULATORY AGENCIES**

1.4.1 Hardware for doors in fire separations and exit doors shall be certified by a Canadian Certification Organization accredited by the Standards Council of Canada.

1.5 **HARDWARE LIST**

1.5.1 A full Finish Hardware List is included with this document.

1.6 **QUALITY ASSURANCE**

1.6.1 Meet requirements of Ontario Building Code and regulations.

1.6.2 Use ULC / ULI listed and labeled hardware for doors in fire separations and exit doors.

1.6.3 Work of this section is to be done by contractors who are accredited by the A.H.C. and having personnel with a minimum of 5 years experience in this type of work and who have the necessary equipment to carry out the work.

1.6.4 The hardware supplier is responsible for the administration and servicing of the hardware contract.

1.6.5 Approved Hardware Suppliers: Door hardware shall be supplied by one of the following companies:
.1 Commercial Doors and Hardware
.2 Rivett Architectural Hardware
.3 Upper Canada Specialty Hardware

1.7 **PRODUCT DELIVERY AND HANDLING**

1.7.1 Each item of hardware shall be clearly itemized and labeled in accordance with the schedule, and delivered in the original manufacturer’s containers. Deliver, store and handle units so as to prevent damage. Do not remove units from packaging until ready for installation.

1.7.2 Hardware supplier shall be responsible for delivery time and date to the job site or door manufacturer of all hardware so that all work may progress without delay or interruptions. The hardware supplier and hardware installer together shall check in detail hardware delivered to the site to prevent discrepancies or shortages and omissions.

1.7.3 Storage and protection of the hardware is the responsibility of the hardware installer. A room shall be provided with ample temporary shelving for the laying out of the hardware. This room is to be locked at all times and only responsible personnel having access. All hardware not installed at completion of each day shall be returned to storage room to prevent any loss. Provide a written confirmation to the Architect that the storage area is adequate and secure.

1.8 **SUBMITTALS**

1.8.1 Within ten (10) calendar days after award of Hardware Contract, submit:
Submit detailed hardware and keying schedule to comply with Owner’s standards for approval prior to placing order.

a) Six (6) copies of a detailed Finish Hardware List prepared by a currently active AHC member of the American Society of Hardware Consultants, list all items proposed to be furnished and delivered under this Section.
b) Identify each hardware item by Manufacturer, Manufacturers' Catalogue number, Material, Function, Finish, and Location of item in the work.
c) Make a list in a form suitable for checking by Architect. Format of hardware listings in these specifications are to be maintained.
d) Manufacturers' specification, catalogue cuts and other data required to identify individual components listed and/or to demonstrate compliance with specified requirements for all items contained in the Finish Hardware List.
Submission of manufacturers' full line brochures is not acceptable.

1.8.2 Approval of hardware list by Architect and/or Board Representative shall not relieve Contractor from responsibility for furnishing all required finish hardware.

1.8.3 Templates: Within ten (10) calendar days of being requested by Architect and / or Door & Frame Manufacturer, submit templates for door and frame preparations and/or mounting of finish hardware items. Identify each template by label indicating applicable specification paragraph number, brand name and number, door number and hardware package number.

1.8.4 Samples:
a) Submit to the Consultant one sample of each of the following items in accordance with Section 01340 – Construction Submittals.
i) Butt hinges
ii) Continuous hinges
iii) Door closers
iv) Exit devices
v) Overhead stops
vi) Storeroom set with lever trim
b) Identify each sample by a label indicating location for installation, applicable specification paragraph number, brand name and number, finish, and hardware package number.
c) Samples will be retained by the Consultant during the initial review period, but not exceeding one month. Samples will be returned at that time and, if acceptable, they may be incorporated into the Work.
d) Substitute new samples for those rejected by the Consultant.
e) Do not supply door hardware to the site until all samples are approved by the Consultant.
f) **Best Factory Orde**r: Within 2 days of submitting the order for Best cylinders or locks, send one (1) copy of the order c/w the ***approved hardware list and a copy of the Architectural Drawings*** to the Durham District School Board,

1.9 MAINTENANCE DATA

1.9.1 Provide operation and maintenance data for power door operators, door closers, locksets, door holders and exit devices for incorporation into maintenance manual specified in Section 01340 – Construction Submittals.

1.9.2 Brief Owner's Maintenance Staff regarding proper care, cleaning, and general maintenance of door hardware.

1.10 MAINTENANCE MATERIALS

1.10.1 Supply four (4) sets of wrenches for door closers, locksets, and exit devices.

1.10.2 Supply four (4) sets of other special parts or tools required for proper maintenance and adjustment of door hardware. (Excluding tools required for keying).

1.11 **TEMPLATES**

1.11.1 Upon award of a contract, the hardware supplier shall check the schedule of hardware and all applicable drawings and specifications and furnish promptly to the applicable trades via the General Contractor all templates and information required for proper preparation for and applications of hardware, in ample time to facilitate the progress of the work.

a) Identify each template by label indicating applicable specification paragraph number, brand name and number, door number, and hardware package number.
b) Submit manufacturer's specifications, catalogue cuts, and other data required to identify individual components listed and to demonstrate compliance with specified requirements for items contained in the final door hardware list. Submission of manufacturer's full line brochures is not acceptable.

1.12 **DELIVERY & STORAGE**

1.12.1 Ensure shipments are made in a timely manner to ensure progress of the Work and to comply with the Contractor's construction schedule.

1.12.2 Store door hardware in a locked, clean and dry area and in a manner to allow easy access to each item group as needed without disruption of the storage arrangement.

1.12.3 Package each item of hardware including fastenings, separately or in like groups of hardware. Label each package as to item definition and location and corresponding with the hardware list.

1.12.4 Maintain current inventory list with hardware list.

1.12.5 In the event of damage to hardware items, immediately make all repairs or replacements as necessary to the approval of the Board's Architect / Representative and at no additional cost to the Board.

1.13 **EXAMINATION OF DOCUMENTS**

1.13.1 The Supplier shall thoroughly check the Door Finish Schedule(s), Working Drawing(s) and other Contract Documents to ensure that the hardware listed can be used as specified in accordance with the latest Building Code(s) and the function indicated. Bring to the attention of the Architect any errors or omissions therein.

1.14 **WARRANTY**

1.14.1 Submit to the Architect a written warranty that all work of this Section shall be free from defects in workmanship and materials for a minimum period of three (3) years, except where a manufacturer's standard warranty period exceeds three years it shall prevail.Warranty for all exit devices and power door operators shall be for five (5) years or where manufacturer's standard warranty period exceeds the five years it shall prevail. The warranty for door closers shall be for a period of ten (5) years. Provide a lifetime warranty for all mortise hinges. Date of commencement for warranty shall be from the date of Substantial Performance of the Construction Contract. The warranty shall be on a form approved by the Board's Architect / Consultant.

1.14.2 All defects in material and workmanship that become apparent during the warranty period are to be made good or the product replaced to the satisfaction of the Board's Architect/Consultant and at no cost to the Board.

2. **PRODUCTS**

2.1 **DOOR HARDWARE**

2.1.1 The hardware supplier shall thoroughly review the door hardware list included with this project manual, the architectural door and hardware schedules, and the drawings prior to preparing the final door hardware list.

2.1.2 The base bid shall be based on the manufacturers and products specified and listed in the attached Door Hardware List and Article 2.2 below.

a) For proposed alternatives, refer to Document 01601 – Material and Equipment: Availability and Substitutions. Confirm with the Architect for acceptance of all Proposed Alternatives prior to submitting Final Hardware List for approval.

b) All door hardware to heavy-duty commercial grade.

c) Locks and latch sets: mortise type with through bolted trim.

d) Cylinders: Schlage.

e) Mortises: Schlage.

f) Four pair hinges at all doors designated as heavy traffic on door schedule. (Continuous hinges not accepted)

g) Door closers: surface mounted: LCN models 4041&1461series.

h) Butt hinges: full mortise type.

2.1.3 Use one manufacturer's products only for all similar items.

2.1.4 Ensure that the hardware specified is suitable in both dimension and function for the intended purpose. Advise the Board's Architect/Representative of discrepancies or omissions.

2.1.5 FASTENINGS

.1 Supply screws, bolts, expansion shields and other fastening devices required for the satisfactory installation and operation of hardware, and as recommended by the hardware manufacturers for long life under hard use.
.2 Exposed screws for installing hardware shall have Phillips or Robertson heads.
.3 Exposed fastening devices shall match the finish and material of hardware.
.4 Where a pull is scheduled on one side of a door and a push plate on the other side, supply fastening devices, and install so the pull can be secured through the door from the reverse side. Install the push plate to cover fasteners.
.5 Use fasteners compatible with material through which they pass.
.6 All door closers shall be through-bolt mounted.

2.2 **HARDWARE SCHEDULE**

Refer to Hardware Schedule prepared for this project for details.

3. **EXECUTION**

3.1 **INSTALLATION INSTRUCTIONS**

.1 Furnish door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware. Advise door and frame manufacturers to be aware that strike heights as listed in the table below are required for this project.

.2 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 INSTALLATION

.1 ALL DOORS, FRAMES, AND FINISHING HARDWARE SHALL BE INSTALLED BASED ON DHI INSTALLATION GUIDE FOR DOORS AND HARDWARE.
(ANSI/DHI A115.1G-1994 – Approved 8/19/94)

Door hardware shall be installed by an approved Hardware Installer acceptable to the Hardware Supplier. Power door operators, complete with hook-up to power rough-in, low voltage control wiring, and exit device release, shall be installed by the manufacturers' recommended installer.

.2 Power door operators to be installed by hardware supplier. Low voltage control wiring to push button locations, exit device release, and 4" x 4" back boxes to be completed by Division 16 (Electrical Contractor.)

.3 ARCHITECTURAL HARDWARE INSTALLER:

1. The Hardware Installer shall carefully check manufacturer's installation instructions supplied with hardware products for conflicts with the above noted dimensions.
2. The Hardware Installer shall use manual or "Yankee" screw drivers to turn screws into pre-drilled pilot holes for installation of hinges on mineral core fire protection rated doors. Please note that other methods of installation may void the door manufacturer's warranty.
3. The recommended mounting heights shall be considered a general guide unless conditions such as intermediate rails and lines of glass dictate otherwise.
4. Locate door stops to contact doors 75mm from latch edge.
5. Install hardware and trim square and plumb to doors.
6. Install mullion stabilizers at centre mullions at double doors and intermediate mullions on multiple door arrangements.
7. Supply locksets to Section 06200 – Architectural Woodwork for 35mm and 45mm thick doors where such doors are a part of millwork units. Keying shall be in accordance with the building keying system for doors.
8. Install mullion stabilizers at centre mullions at double doors and intermediate mullions on multiple door arrangements.

3.3 ADJUSTING, INSPECTION, AND CLEANING

.1 Adjust hardware so that latches, locks and closers operate smoothly and without binding and with minimal resistance in use.

.2 Ensure doors with closers close firmly and against wind and building air pressure, and can be opened readily as suitable for installation.

.3 Inspection

.1 The Hardware Supplier shall have in his employ an Architectural Hardware Consultant who is a current member of the American Society of Hardware Consultants, and who shall be made available for consultation during the course of construction at no additional cost to the Board.

.2 Upon completion of door hardware installation, the Hardware Supplier shall submit written certification that all hardware has been correctly supplied, installed in accordance with the drawings, specifications, schedules, and approved final door hardware list, for type, function, and location, and that door hardware has been checked and adjusted.

.3 Upon completion of door hardware installation, the Architectural Hardware Inspector shall conduct an inspection of all door hardware as installed, accompanied by the Consultant, the Owner's representative, and the Contractor.

.4 During the inspection, the Architectural Hardware Inspector shall note all unsatisfactory installations and products and re-inspect these items after re-adjustment or replacement to ensure all hardware is in optimum working condition and specified function.

.5 Clean hardware after installation following the hardware supplier's recommendations.

.6 At project completion, all items of door hardware shall be clean and free from disfigurement. The Contractor shall repair or replace hardware found to be defective.

END OF SECTION

1. **GENERAL**

1.1 **DESCRIPTION**

1.1.1 Comply with Section 01005 "General Requirements".

1.1.2 The work described in this section consists of the supply and installation of glass as indicated on the drawings.

1.2 **RELATED WORK SPECIFIED ELSEWHERE**

Hollow Metal Doors, Frames and Screens under Section 08100.
Aluminum Doors, Frames and Screens under Section 08400.
Framed Mirrors under Section 10800

1.3 **QUALITY ASSURANCE**

1.3.1 Every pane of glass shall be factory labeled and the label shall remain in place until final cleaning for verification of components by the Architect. Mis-labeled panes or panes without labels shall be replaced at the direction of the Architect at no additional cost to the Owner.

1.3.2 Work of this section is to be done by contractors of recognized standing having personnel with a minimum of 5 years experience in this type of work and who have the necessary equipment to carry out the work. Manufacturers and contractors are to comply to the Standards of the Insulated Glass Manufacturers of Canada Ltd., latest edition.

1.3.3 Approved manufacturers of sealants, glazing tapes, splines, etc. are as follows: Tremco Canada Ltd.

1.4 **STORAGE AND HANDLING**

1.4.1 Deliver and store materials undamaged at the site in their original packages with manufacturers' labels and seals intact. Maintain protective coverings until materials are required. Store materials on a level base, off the ground. Take care to prevent scratching of glass from cutting and tools.

1.4.2 Deliver materials to site only as required. Leave all materials in their original cartons or wrapping until required.

1.4.3 Identify all glass delivered to job with manufacturer's labels until after approval of glazing work.

1.4.4 Glaze only when temperature is above 4 ℃. Do not glaze when sash or frames are wet, damp, or frosted.

1.5 **PROTECTION**

1.5.1 Protect work of other trades from damage resulting from work of this section.

1.5.2 Identify glazed openings immediately following glass installation. Do not apply tapes directly to glass.

1.6 **WARRANTY**

1.6.1 Provide owner with a written warranty that warrants replacement at no cost to owner of all factory sealed insulating window units should obstruction of vision develop due to dust or film forming on inner glass surfaces within a period of ***10 years*** from date of Substantial Performance of the Contract.

1.6.2 Mirrors and Interior Glazing (non-IGU): Provide owner with a written warranty that warrants replacement at no cost to owner of all mirrored glass and interior glazing units should obstruction of vision develop due to de-silvering or film forming on glass surfaces within a period of 5 years from date of Substantial Performance of the Contract unless otherwise specified.

1.7 **SUBMITTALS**

1.7.1 Prior to fabrication / cutting submit in accordance to the requirements of Section 01300, to the Architect for review, a complete Glazing Schedule identifying every pane of glass in every window / door (interior and exterior) identifying the glazing type and components utilized for that unit. Glazing schedule shall be referenced to Contract Documents and glazing labels fixed to each installed unit. All units required to meet guard loading requirements per OBC, latest edition shall be designed as such, indicated as such on the glazing schedule and bear the seal and signature of structural engineer responsible for the design of the glazing / window systems.

1.7.2 Every pane of glass shall be factory labeled and the label shall remain in place until final cleaning for verification of components by the Architect against the approved Glazing Schedule. Undetermined panes, mis-labeled panes or panes without labels at time of Architects review shall be replaced at the direction of the Architect at no additional cost to the Owner.

2. **PRODUCTS**

2.1 **MATERIALS**

2.1.1 GLASS:
a) Base Manufacturer: AGC Glass company North America. unless otherwise specifically noted.
b) Alternate Manufacturers: demonstrated equivalent systems by Libby -Owens Ford, PPG Industries, Viracom.
c) Accessories: as listed below only in accordance with glass manufacturer's list of compatible products.

2.1.2 Setting Blocks: Neoprene, Shore 'A' duro-meter hardness of 70 to 90 points; spacer shims, 40 to 50 points, as recommended by glass manufacturer.

2.1.3 Glazing Compound: Non-hardening modified oil type meeting requirements to CGSB 19-GP 2M.

2.1.4 Glazing Sealant: One part polysulphide to CAN2-19.13-M82 or one part silicone to CGSB 19-GP-18M.

2.1.5 Glazing Tape: Polyshim 2 Tape by Tremco.

2.1.6 Glazing Gasket: E.P.D.M. Glazing Gasket by Tremco.

2.1.7 Interior Glass:
a) Frosted Glass: 6mm thick polished, frosted one side glass to CAN2-12.3-M76
b) Interior Tempered Safety Glass (**TGL**): 6 mm thick fully tempered float glass to CAN2-12.1-M79. Tempered glass identification must be sandblasted into glass and shall be visible after installation.
c) Fire-rated glass**(FRGL)**: FireLite NT, 5 mm thick fire-rated and impact safety-rated glazing material, composed of FireLite and surface-applied fire-rated film, by Technical Glass Products, or CONTRAFLAM. Fire-Rated Clear Laminated Safety Glass (fire rating as noted in the drawings)

2.1.8 Exterior Glass:
a) Insulating Glass **(IGU)**: exterior non-fire-rated sealed units for windows and curtain wall shall meet CAN-CGSB-12.8-M76, minimum doble units, 25mm minimum overall thickness.

- ***Exterior lite***: glassing to be clear 6mm thick tempered safety glass with low-E coating on glass surface number two.
- ***Interior lite***: glazing to be clear 6mm thick tempered safety glass.

- Low-E coating (Soft coat) on East and North Elevations: High performance sputtered low-E coating. Provide insulating glass units with warm edge spacer and low-E coating. Apply low-E coating to second surface unless otherwise indicated. 'Cardinal LoE-272' by Cardinal Glass Industries, 'SN 68' by Guardian Industries or 'Solarban 60' by PPG

- Low-E coating (Soft coat) on West and South Elevations: High performance sputtered low-E coating. Provide insulating glass units with warm edge spacer and low-E coating. Apply low-E coating to second surface unless otherwise indicated. 'Cardinal LoE-366' by Cardinal Glass Industries, 'SNX 62' by Guardian Industries or 'Solarban 70XL' by PPG.

- Double-glazed units to have an integral no-metallic spacer creating a 13mm. hermetically sealed argon filed air space. Spaces should be continuous with butt joints at corners only.

b) Fire-rated glass **(FRGL)**: FireLite NT, 5 mm thick fire-rated and impact safety-rated glazing material, composed of FireLite and surface-applied fire-rated film, by Technical Glass Products, or CONTRAFLAM. Fire-Rated Clear Laminated Safety Glass (fire rating as noted in the drawings)

c) Fire-rated glass block **(FRGLB)**: THICKSET 90, 60Min fire-rated and Sound Transmission Class (S.T.C)50, by Pittsburgh Corning Glass Block products. www.pittsburghcorning.com

2.2 Glazing Schedule:
a) All exterior windows: Insulating Glass
b) All glazed interior windows, doors and screens to be 6mm-thick tempered safety glass, unless permitted by code.
c) Where fire rated glass is required use **FireLite**, or **ContraFlam.**

2.2.4 Framed Mirrors: specified under Manufactured Specialties Section 10800.

3. EXECUTION

3.1 GLASS INSTALLATION GENERAL

3.1.1 Do not glaze when ambient or surface temperature is less than 5^0C. Ensure that glazing rabbets, stops and glass are dry, free of frost, grease, oil, dust, rust and other substances detrimental to adhesion of compounds and sealants.

3.1.2 Provide clearance at perimeter edge of glass on all four sides, minimum equal to glass thickness. Accurately cut glass to fit openings, allowing for expansion in accord with glass manufacturer's recommendations.

3.1.3 Provide sealer space between face of glass and glazing stops of minimum 3 mm.

3.1.4 Clean sealing surfaces at perimeter of glass and sealing surfaces of rabbets and stop beads before applying glazing tapes, gaskets and compounds. Use solvents and cleaning agents recommended by manufacturer of sealing materials.

3.1.5 Install glazing tapes uniformly with accurately formed corners and bevels. Ensure that proper contact is made with glass and rabbet interfaces.

3.1.6 Set glass on setting blocks, spaced as recommended by glass manufacturer. Provide at least one setting block at quarter points from each corner.

3.1.7 Center glass in glazing rabbet to maintain specified clearances at perimeter on all four sides. Maintain centered position of glass in rabbet and provide the required sealer thickness on both sides of glass.

3.1.8 Use spacers and shims in accordance with glass manufacturer's recommendations.

3.1.9 Carefully remove glazing stops and reinstall after glazing.

3.1.10 Mark each pane of glass with a white cross of flour paste or other approved means to indicate presence of glass.

3.1.11 Every pane of glass shall be factory labeled and the label shall remain in place until final cleaning for verification of components by the Architect. Mis-labeled panes or panes without labels shall be replaced at the direction of the Architect at no additional cost to the Owner.

3.2 INTERIOR GLAZING

3.2.1 Unless otherwise indicated glaze interior openings as follows:

a) Apply glazing compound to permanent stop; set glass on setting blocks, align edges and press home.
b) Butter removable stops with glazing compound and secure firmly in place.
c) Glazing to be on interior side of all doors and frames unless otherwise specifically noted.

3.3 EXTERIOR GLAZING

3.3.1 Unless otherwise indicated glaze exterior openings as follows:

a) Apply glazing tape to permanent stop; butt tape joints and weld together; do not overlap joints; daub tape corners with sealant.
b) Set glass on setting blocks, align edges and press home to ensure adhesion at all points.
c) Apply heel bead of sealant around perimeter of glass, maintaining 5 mm. bite to glass and positive bond to frame. Completely seal void around glass edges. Sealant shall partially fill channel between glass and removable stop.
d) Install removable stops; insert spacer shims between glass and stops at approx. 610 mm. o/c. not less than 6 mm. below sight lines. Fill remaining void with glazing compound or sealant to sight line and trim to clean line leaving no voids or depressions.
e) Glazing gaskets may be installed in lieu of backfilling with sealant of glazing compound after setting removable stops.
f) Glazing to be on exterior side of frame on all exterior glazing.
g) All glazing at doors and screens to be tempered glass, unless not permitted by code.

3.4 COMPLETION

3.4.1 Tighten all stops and ensure they are properly secured.

3.4.2 Remove dirt, scum, plaster, paint spatter, and other harmful and deleterious matter from glass promptly and completely, before they establish tight adhesion.

3.4.3 Avoid using abrasive, steel wool, razor blades, solvents, alkaline or other harsh cleaning agents.

3.4.4 Remove excess sealant using solvents as recommended by sealant manufacturer.

3.4.5 Remove glazing compound droppings promptly from all surfaces as the work progresses.

3.4.6 Replace scratched or otherwise damaged glass.

3.4.7 After inspection by consultant remove all labels and polish glass.

3.4.8 Wash down exposed surfaces with a mild solution of tri-sodium phosphate in warm water and dry with soft clean wiping cloths; polish all glass.

3.4.9 All exterior glazing stops to be installed using non-removable screws.

3.5. **CLEAN–UP**

3.5.1 Collect all glass cuttings in boxes and promptly remove from the site.

3.5.3 Promptly, as the work proceeds and on completion, clean up and remove from the premises all rubbish and surplus materials resulting from this work.

END OF SECTION

1. **GENERAL**

1.1 **DESCRIPTION**

1.1.1 The work described in this section consists of the supply and installation of mold- and moisture-resistant gypsum board (drywall) partitions, bulkheads and ceilings.

1.2 **WORK INCLUDED**

Cold formed metal framing.
Metal channel ceiling framing.
Plywood
Acoustic Insulation.
Gypsum Board.
Fire protection of structural elements.
Taped and sanded joint treatment.

1.3 **RELATED WORK**

Section 06100 - Rough Carpentry: Wood blocking.
Section 07200 - Insulation: Thermal insulation and fastening studs to exterior walls.
Section 08100 - Standard Steel Frames.
Section 09900 - Painting: Surface finish.

1.4 **REFERENCES**

1.4.1 Unless otherwise specified, do work in accordance with CSA–A82.27–M91 and approved manufacturer's printed instructions as applicable.

ASTM C630 - Water Resistant Gypsum Backing Board.
ASTM E90 - Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
ASTM E119 - Fire Tests of Building Construction and Materials.
CGSB 19-GP-21M - Sealing and Bedding Compound for Acoustical Purposes.
CSA A82.27M - Gypsum Board Products.
CSA A82.30M - Interior Furring, Lathing, and Gypsum Plastering.
CSA A82.31M - Gypsum Board Application.
ULC List of Equipment and Materials, Volume II, Building Construction.

Cold-Formed Steel Framing Design Standards:
Floor and Roof Systems: AISI S210.
Wall Studs: AISI S211.
Headers: AISI S212.
Lateral Design: AISI S213.
Truss Design: AISI S214.

Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.

1.5 **QUALITY ASSURANCE**

1.5.1 Applicator: Company specializing in gypsum board systems work with five years documented experience.

1.5.2 Delegated Design: Engage a qualified Specialty Structural Engineer to design cold-formed steel framing. Provide Engineer stamped drawings for stud framing design.

1.6 REQUIREMENTS OF REGULATORY AGENCIES

1.6.1 Provide fire separations and fire protection exactly as specified in Underwriters' Laboratories of Canada test design specification Design No. that validates the specified rating.

1.6.2 Fire rated gypsum board to be utilized for all rated partitions and assemblies as indicated on drawings to comply with ULC Design or National Building Code Supplement as indicated on drawings.

1.6.3 Provide written confirmation that the suspended ceiling provides adequate support for the electrical fixtures, as required by the current bulletin of the Electrical Inspection Department of Ontario Hydro.

1.7 ENVIRONMENTAL CONDITIONS

1.7.1 Carry out this section only when temperature is maintained and controlled in range of 13^0 C to 21^0 C for at least 24 hours before installing drywall and until joint cement has dried.

1.8 DELIVERY, STORAGE AND HANDLING

1.8.1 Deliver, handle and store materials so as to prevent damage, moisture and contamination from oil, grease and other foreign matter.

1.8.2 Tolerances: Install work within 1/8" maximum in 10'-0".

1.8.3 Store gypsum boards flat and protect edges from damage. Store metal accessories in a manner to protect from rusting, bending and denting.

1.8.4 Provide adequate protection to materials and work of this Section. Protect surrounding surfaces against damage. Use bumpers, drop cloths and other approved means as required to ensure adequate protection.

2. PRODUCTS

2.1 GENERAL

2.1.1 Approved manufacturers of materials to be used are Georgia-Pacific Gypsum, CGC Gypsum, Domtar Gypsum, CertainTeed Gypsum Canada Inc., or approved equal.

2.2 FRAMING MATERIALS

2.2.1 Sheet Steel: Cold-rolled, commercial grade structural quality sheet steel (SS), to ASTM A924/A924M; Zinc-Coated (Hot Dip Galvanized) to ASTM A653/A653M; coating designation [G90(Z275)]

2.2.2 Structural Steel Studs: Conforming to ASTM C645-76, 14ga, 16ga, 18ga hot dipped galvanized steel sheet; flanges minimum 1 1/4" (32mm) edge bent back 90 degrees and doubled to form 1/4" (6mm) minimum return. Face to be knurled. Width 4" or 6" (100mm or 150mm) nominal unless otherwise noted on drawings.

Ceiling Tracks: to ASTM C645, 20ga.(0.91mm) thickness hot-dip galvanized sheet steel, widths to suit stud sizes, 1¼"(32mm) flange height for standard applications; 2"(50mm) flange height for deflection applications.

Stiffener Channels: 1½"(38mm) and 2½"(64mm) width, 18ga.(1.3mm) thick hot-dip galvanized sheet steel, cold rolled channels.

2.2.3 Shaft Wall Framing Components: Thicknesses and sizes required to achieve fire rating indicated; J, C-H and E studs manufactured by Canadian Gypsum Company, Limited or approved alternative.

2.2.4 Furring, Framing, and Accessories: CSA A82.30M, galvanized steel, of gauges and sizes required.

2.2.5 Fasteners: Galvanized steel, manufacturer's standard, suitable for application intended.

2.2.6 Tie Wire: 1.6 mm galvanized soft annealed steel wire.

2.2.7 Hangers: Sized in accordance with ceiling area to be supported as follows:

Max. Ceiling Area	Size of Hangers
1. sq. m	8 ga wire, galvanized
1.8 sq. m	4 mm dia. rods or 32 mm x 3 mm flats

2.2.8 Plywood: ½" (13 mm) and ¾" (19mm) thickness as indicated in the drawings
Hanford Lumber stocks sheathing grade plywood.
sales@hanfordlumber.com Tel. 416.743.5384

2.3 BOARD MATERIALS

2.3.1 Standard Gypsum Board: ***ToughRock Ligth&Strong*** 1/2" (13 mm) thickness.

2.3.2 Fire Rated Gypsum Board: CSA A82.27M, type X, fire resistive type, ULC rated; 16 mm thick unless otherwise indicated or required, maximum permissible length; ends square cut, tapered edges.
Fire rated wallboard shall be classified as to fire hazard by Underwriters' Laboratories of Canada and be labeled in conformance with ULC label service for application specified.
DensArmor Plus Fireguard gypsum board.

2.3.5 ***DensShield Tile Backer*** in 5/8" (16 mm) thicknesses conform to current IRC and IBC codes and is manufactured to meet ASTM C 1178 as a fiberglass mat gypsum substrate for use as tile backer.

2.3.6 All gypsum board to have anti-microbial/anti-mold properties.

2.4 ACCESSORIES

2.4.1 Acoustical Insulation: Semi-rigid, paperless, Sound Attenuation Blanket distributed by Rockwool or approved alternative.

2.4.2 Acoustical Sealant: CGSB 19-GP-21M, non-hardening, non-skinning, for use in conjunction with gypsum board.

2.4.3 Casing Beads, Corner Beads: Galvanized sheet steel; perforated flanges; one piece length per location.

2.4.4 Edge Trim: Galvanized steel with J type bead.

2.4.5 Reveal Trim: Galvanized steel, 13 mm reveal, where indicated.

2.4.6 Resilient Channels: RC-1 manufactured by CGC Company Limited or approved alternative.

2.4.7 Joint Materials: CSA A82.31M, reinforcing tape, joint compound, adhesive, water, fasteners; as recommended by board manufacturer for intended use.

2.4.8 Laminating Adhesive:
a) to wood framing and to metal studs: CGSB 71-GP-25M;
b) to concrete and concrete block: Durabond 90 manufactured by CGC Company Limited or approved alternative; or as recommended by gypsum board manufacturer.

2.4.9 Access Panels: For ceiling: WB-FR-C Fire-rated and non-rated Ceiling Access Door manufactured by Williams Brothers Corporation; sizes and locations indicated on mechanical and electrical drawings; appliance white baked enamel finish unless otherwise indicated.

2.4.10 Corner Guards: Install all exposed corners in high traffic areas and corridors.
18-gauge Stainless Steel Corner Guard with 3-1/2" Wing in 90 Degree. Size: 1200mm (4’), Standard mounting with construction adhesive.

3. EXECUTION

3.1 PREPARATION

3.1.1 Clean surfaces of dust, loose particles and foreign matter. Ensure proper ventilation in work area.

3.1.2 Carry out the work of this section by mechanics skilled in this trade, in accordance with CAN/CSA–A82.31–M91.

3.2 PARTITIONS

3.2.1 Support partitions laterally at top and bottom for service load of 3.0 kN.m. Detail top support to permit differential vertical movement of floors above and below. Unless indicated otherwise, allow movement of ±12 mm.

3.3 METAL STUD INSTALLATION

3.3.1 Install studding in accordance with CSA A82.31M, and manufacturer's instructions.

3.3.2 Metal Stud Spacing: 600 mm o/c unless indicated otherwise.

3.3.3 Partition Heights: Full height with gypsum board to floor or roof construction above or as indicated or required. Install additional bracing for partitions extending above ceiling. Install fire rated partitions from floor to underside of structure above. Frame around structural elements with equivalent construction to maintain fire ratings.
All partitions to underside of deck with fire and smoke seals.

3.3.4 Door Opening Framing: Install double studs at door frame jambs.

3.3.5 Blocking: Bolt or screw steel channels to studs. Install blocking for support of plumbing fixtures, toilet partitions, toilet accessories, and elsewhere as required.

3.3.6 Coordinate installation of bucks, anchors, blocking, electrical and mechanical work placed in or behind partition framing.

3.4 CEILING FRAMING INSTALLATION

3.4.1 Install in accordance with CSA A82.31M, and manufacturer's instructions.

3.4.2 Install framing for cement board ceiling in accordance with cement board manufacturer's instructions.

3.4.3 Coordinate location of hangers with other work.

3.4.4 Install ceiling framing independent of walls, columns, and above ceiling work.

3.4.5 Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 600 mm past each end of openings.

3.4.6 Reinforce ceiling to carry mechanical and electrical loads imposed thereon.

3.4.7 Laterally brace entire suspension system.

3.5 GYPSUM BOARD INSTALLATION

3.5.1 Install gypsum board in accordance with CSA A82.31M, and manufacturer's instructions.

3.5.2 Where indicated, laminate gypsum wallboard directly to concrete block with laminating adhesive.

3.5.3 Erect single layer standard gypsum board in most economical direction, with ends and edges occurring over firm bearing.

3.5.4 Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.

3.5.5 Use screws when fastening gypsum board to metal furring or framing.

3.5.6 Where double layer of wallboard is indicated or required, overlap joints of base and face layers.

3.5.7 Treat cut edges and holes in moisture resistant gypsum board and exterior gypsum ceiling board with sealant.

3.5.8 Place control joints consistent with lines of building spaces as indicated or as directed.

3.5.9 Place corner beads at exposed edges and external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials as indicated. Place casing beads at perimeter of gypsum board ceilings. Fasten with screws or staples at 300 mm o/c along entire length.

3.5.10 Provide a continuous moisture resistant insulating material at edges of gypsum wallboard in contact with metal windows and exterior door frames to provide a thermal break.

3.5.11 Install hollow metal door frames (supplied under Section 08100) located in metal stud and gypsum board partitions. Attach metal studs to door frame anchors with 10 mm CGC drywall screws.

3.5.12 Furr-out and apply gypsum board around ducts and pipes projecting into room areas where indicated or required.

3.5.13 At fire – rated walls and ceilings ensure gypsum board membrane continuous through intersection by staggering and alternating layers to interlock joint. At non – rated walls continue wall board minimum 6" above adjacent ceiling level unless indicated otherwise (ie. To u/s of deck for acoustic barriers).

3.6 **FIRE STOPPING**

3.6.1 Construct fire separations tightly to enclosing construction to maintain integrity of separation. Provide fire stopping at all fire separations at spaces between the separation and structural and mechanical elements adjoining or passing through the separation.

3.7 **ACCESS PANELS**

3.7.1 Provide J moulds at exposed gypsum board edges.

3.7.2 Reinforce panel with plywood as required.

3.7.3 Install access panels in accordance with manufacturer's instructions. Ensure continuity of fire resistance rating.

3.8 **CONTROL JOINTS**

3.8.1 Provide shrinkage control joints to Consultant's approval and as noted on drawings. Place control joints consistent with lines of building spaces as indicated or as directed.

3.8.2 Construct control joints of two back-to-back J moulds set in gypsum board facing and supported independently on both sides of joint.

3.8.3 Provide continuous polyethylene dust barrier behind and across control joints.

3.8.4 Locate control joints at approximately 7600 mm in walls and ceilings and where indicated on drawings. Locate control joints at approximately 3600 mm o/c in cement board ceilings and where indicated on drawings. Install additional control joints as directed on site by Consultant.

3.8.5 Install control joints straight and true.

3.9 **JOINT TREATMENT**

3.9.1 Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

3.9.2 Feather coats onto adjoining surfaces so that camber is maximum 0.8 mm.

3.9.3 Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile.

3.10 **TOLERANCES**

3.10.1 Maximum Variation from True Flatness: 3 mm in 3 m in any direction.

END OF SECTION

1. GENERAL

1.1 DESCRIPTION

1.1.1 The work described in this section consists of the supply and installation of:
Suspended metal grid ceiling system.
Acoustical panels.
Perimeter trim.

1.1.2 Include all areas where new services and connections require removal / replacement of existing ACT ceilings. All replacement with new materials unless otherwise specified / agreed to by the Architect.

1.2 RELATED WORK

Section 09250 - Gypsum Board Systems: Suspended gypsum board ceilings.
Division 16 - Electrical: Light fixtures in ceiling system.

1.3 QUALITY ASSURANCE

1.3.1 Installer: Company with three years minimum documented experience.

1.3.2 Installation: ASTM C636 except where specified otherwise.

1.3.3 Fabrication: ASTM C635.

1.4 SUBMISSIONS AND INSTALLATION INSTRUCTIONS

1.4.1 Submit TWO identical samples of each type utilized for panel and grid.
material 300 mm x 300 mm Panel and 300mm. sample of each grid type specified.
Submit manufacturer's installation instructions to requirements of Section 01340 for review prior to commencing installation.

Submit complete assembly specifications for required fire-rated assemblies.

1.5 SEQUENCING / SCHEDULING

1.5.1 Do not install acoustical ceilings until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

1.5.2 Schedule installation of acoustic units after interior wet work is dry.

1.6 EXTRA STOCK

1.6.1 Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.

Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

1.6.2 Maintenance materials shall be same production run as installed materials.

1.7 **WARRANTY**

1.7.1 A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:
1. Acoustical Panels: Sagging and warping
2. Grid System: Rusting and manufacturer's defects

B. Warranty Period:
1. Ceiling System: Thirty (30) years from date of substantial completion

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.8 **ENVIRONMENTAL REQUIREMENTS**

1.8.1 Standard Ceilings: Do not install interior ceilings until space is enclosed and weatherproof; wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are continuously maintained at values near those intended for final occupancy. Building areas to receive ceilings shall be free of construction dust and debris.

2. **PRODUCTS**

2.1 **MANUFACTURERS**

A. Ceiling Panels:
1. Basis of Design, Armstrong World Industries, Inc. to match existing

B. Suspension Systems:
1. Armstrong World Industries, Inc.

2.2.1 ACOUSTICAL CEILING UNITS

A. Acoustical Panels Type AP
1. Surface Texture: to match existing
2. Composition: Mineral Fiber
3. Color: White
4. Size: 600mm x 1200mm
5. Edge Profile: Square Lay 15/16”
6. Noise Reduction Coefficient NRC ASTM C423 Classified with UL label on product carton 0.75
7. Ceiling Attenuation Class CAC: ASTM C 1414; Classified with UL label on product carton 30
8. Flame Spread: ASTM E 1264; Class A (UL)
9. Light Reflectance (LR): N/A
10. Dimensional Stability: HumiGuard Plus
11. Recycle Content: Up to 76% total recycled content. Pre-consumer, Post-consumer and Post-industrial.
12. Acceptable Product: “Fine Fissured”, #1729M by Armstrong World Industries Canada Limited; colour: white.

2.3.1 METAL SUSPENSION SYSTEMS

A. Components:

Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.

a. Structural Classification: ASTM C 635 Heavy Duty

b. Color: White to coordinate with the selected ceiling tile, unless noted otherwise.

c. Sustainability: Environmental Product Declaration (EPD), Health Product Declaration (HPD)

d. Acceptable Product: PRELUDE XL or ML 15/16" Exposed Tee as manufactured by Armstrong World Industries

B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

C. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.

D. Edge Moldings and Trim

E. Accessories

3. EXECUTION

3.1 EXAMINATION

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations. (Exception: HumiGuard Max Ceilings)

3.2 INSTALLATION

A. Follow manufacturer installation instructions.

B. Install suspension system and panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.

C. Suspend main beam from overhead construction with hanger wires spaced 4-0 on center along the length of the main runner. Install hanger wires plumb and straight.

D. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.

E. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.

F. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.3 **TOLERANCES**

3.3.1 Variation from Flat and Level Surface: 3 mm. in 3 m.

3.3.2 Variation from Plumb of Grid Members Caused by Eccentric Loads: 2^0 max.

3.4 **CLEANING**

3.4.1 Touch up scratches, abrasions, voids and other defects in painted surfaces. Replace all damaged ACT tiles in the place of Work with new stock prior to turnover.

3.5 **MAKE GOOD**

3.5.1 Make good existing acoustic treatment at junctions with the new work. All revised areas to receive new tiles unless otherwise specified / approved by the Architect.

END OF SECTION

1. GENERAL

1.1 DESCRIPTION

The work described in this section consists of the supply and installation as follow:

a) MAXFLOR+ as indicated in the drawings.
b) VCT flooring and base
c)

1.2 REFERENCES

ASTM E84 - Surface Burning Characteristics of Building Materials.
CSA A126.1M - Vinyl Asbestos and Vinyl Composition Floor Tile.
CSA A126.2M - High Vinyl Floor Tile.

1.3 REGULATORY REQUIREMENTS

1.3.1 Conform to Ontario Building Code for flame/fuel/smoke rating requirements in accordance with ASTM E84.

1.4 MAINTENANCE INSTRUCTIONS

1.4.1 Furnish the owner with four copies of the tile manufacturer's printed instruction manuals on the proper care and maintenance of the installed flooring.

1.5 STORAGE AND HANDLING

1.5.1 Deliver and store materials at the site in their original sealed containers or packages and clearly labeled as to the manufacturer's name and quality of contents.

1.5.2 Protect materials from damage, moisture and soiling during storage, handling and placing.

1.6 ENVIRONMENTAL REQUIREMENTS

1.6.1 Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.6.2 Maintain ambient temperature of 20^0C three days prior to, during, and 48 hours after installation of materials.

1.6.3 Ensure that work is performed in conformance with latest regulations under Occupational Health and Safety Act. Adhere strictly to W.H.M.I.S. regulations. Be responsible to instruct and guide workers in proper methods of work under W.H.M.I.S. Provide Material Safety Data Sheets for all canned products.

1.7 EXAMINATION

1.7.1 Examine well in advance of application, surfaces of other trades which will affect work of this section.

1.7.2 Check floor surfaces for evidence of carbonation, dusting and excessive moisture.

1.8 EXTRA MATERIALS

1.8.1 Provide 5% or nearest larger case lot of total quantity of each colour and pattern of flooring material and base required for this project for maintenance use. Store where directed.

1.8.2 Material to be from same production run as material installed.

1.9 PROTECTION

1.9.1 Do not permit traffic or work of other trades on areas where tiling is in progress and following completion until tiles have properly set.

2. PRODUCTS

2.1 MATERIALS

All materials under Work of this Section, including but not limited to, primers and adhesives are to have low VOC content limits.

2.1.1 Vinyl Composition Tile:CSA A126.1, Type A

a) Vinyl composite tile (VCT-1)
Field Tile: 12" x 12" x 1/8" thick tile by Armstrong – Standard Excelon – Imperial texture.
Final Colour to be selected and approved by Architect from FULL LINE.

2.1.2 Base: Rubber, 100 mm high x 3 mm thick; top set coved; premoulded external corners; of colour selected by Consultant from manufacturer's FULL range. Base Accessories: Premoulded end stops and external corners, of same material, size, and colour as base. Height of base to be consistent throughout room. Approved supplier: Johnsonite or approved equal.

2.1.3 Solid Colored with Marbleized Pattern **Rubber Flooring Tile**.

1. Wear Layer: 2mm (0.078 in) virgin rubber ± 0.5mm (0.02 in)
2. Square Size: 1 m x 1 m (3.28 ft x 3.28 ft) ± 0.5mm (0.02 in)
3. Backing: natural/SBR rubber blend
4. Construction: two-layer calendared and vulcanized rubber
5. Pattern: Speckled
6. Finish: Slight texture
7. Thickness: 9mm (0.35 in) ± 0.5mm (0.02 in) tolerance
8. Colors: Smoke, Charcoal, Sand, Black, Royal Blue, Blue, Lime Green, Dark Green, Red
9. Material Properties:

System category	N/A	Point-elastic
Thickness	EN 428	9 mm
Hardness	ISO 7619	70 Shore A
Abrasion resistance	ISO 4649	90 mm^3
Residual indentation	EN 433	0.3 mm
Dimensional stability	EN 434	± 0.3%
Flexibility (diameter of mandrel 20 mm)	EN 435 - Procedure A	Fulfilled
Classification Residential/Commercial/Industrial	EN 685	24/34/43
Anti-slip properties	DIN 51 130	R 9
Sound absorption	ISO 10140 - 3	15dB
Insulation properties	IEC 60093, VDE 0303 T.30	> 10^{10} Ohm
Tear strength	ISO 34-1, procedure B, method A	40 N/mm
Reaction to fire	EN 13501-1	Cfl - s1

10. Acceptable product: ***MaxFlor+ as distributed by Advantage Sport 1-888-605-3380***

2.1.3 Accessories:

a) Beveled Edging: Black rubber or vinyl transition ramp edging is available from the flooring manufacturer.

a) Floor Filler: Cement-based leveling compound. Recommend Mapei Planipatch, Planipatch-Plus, or an acceptable substitution.

b) Adhesive: 2-part, MaxFlor+ adhesive, solvent-free urethane adhesive as recommended by the manufacturer. (Do not use solvent-based adhesives)

c) Initial Cleaner: PH-neutral bio-degradable cleaner, diluted in clean water to manufacturer's specification.
- Recommended product: Taskiε Profi® or similar product

d) Floor Finish (if required only):
- MaxFlor+ does not require an applied finish.
- Recommended product (if required): Taskiε Wiwaxé or similar product.
- An applied finish may alter the surface characteristic of the floor.

e) Maintenance Cleaner: PH-neutral bio-degradable cleaner, diluted in clean water to manufacturer's specification.

2.1.5 Primers and Adhesives: Waterproof; types recommended by flooring manufacturer. For sheet flooring provide manufacturer's recommended adhesive for wet locations.

2.1.6 Sealer and wax: as recommended by resilient tile manufacturer for specific material and location.

3. EXECUTION

3.1 WORKMANSHIP

3.1.1 As far as possible, all trades, except painting, shall have completed their work in the area before resilient flooring is laid.

3.1.2 Prepare surfaces and install flooring and base in strict accordance with the manufacturer's directions. Perform work neatly and carefully by persons skilled in this trade.

3.1.3 Prepare substrate including removal of existing finishes, cleaning and removal of glue, residue, etc.

3.1.4 Substrate to be smooth and level. Fill fine joints and cracks in sub floor with filler and allow 24 hours to dry.

3.1.5 The temperature of work area/room, floor surface and material shall be maintained at 20^0C for 24 hours before, during and at least 7 days after installation.

3.1.6 Terminate flooring at centre line of door in openings where adjacent floor finish or colour is dissimilar.

3.1.7 Seal perimeter of resilient flooring at walls and millwork with silicone sealant.

3.2 INSTALLATION - TILE MATERIAL

3.2.1 Install in accordance with manufacturer's instructions and installation guide.

3.2.2 Mix tile from container to ensure shade variations are consistent.

3.2.3 Spread only enough adhesive to permit installation of materials before initial set.

3.2.4 Set flooring in place, press with heavy roller to attain full adhesion.

3.2.5 Lay flooring with joints parallel to building lines to produce symmetrical tile patterns.

3.2.6 Install tile to square grid pattern with all joints aligned with pattern grain alternating with adjacent unit to produce basket weave pattern. Allow minimum 1/2 full size tile width at room or area perimeter.

3.2.7 Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.

3.2.8 Install edge strips at unprotected or exposed edges, and where flooring terminates.

3.2.9 Scribe flooring to walls, columns, permanent millwork, floor outlets, and other appurtenances to produce tight joints.

3.4 **INSTALLATION - BASE**

3.4.1 Install base in accordance with manufacturer's instructions. Install all bases at tile after installation of tile.

3.4.2 Install base on solid backing. Bond tight to wall and floor surfaces. Use fillet strip at joint between floor and wall.

3.4.3 Scribe and fit to door frames and other interruptions.

3.4.2 Fit joints tight and vertical. Maintain minimum measurement of 45 mm between joints.

3.4.3 Miter internal corners. At external corners, use pre-moulded units. At exposed ends, use pre-moulded units. Do not notch cut bases and bend to form corners.

3.5 **CLEANING**

3.5.1 Initial Cleaning: *See the Manufacturer's printed Installation Procedures for instructions. Do not proceed with cleaning until 72 hours minimum after installation if the flooring has been glued down.*

3.5.1 After flooring has set sufficiently to allow traffic, remove excess adhesive from floor, base, and wall surfaces without damage.

3.5.2 Remove and replace damaged, not fully adhered, stained, marred or otherwise defective material.

3.5.3 Clean, seal, and wax floor and base surfaces in accordance with manufacturer's instructions.

3.5.4 Prior to turnover – scrub the floor using a neutral detergent and a floor machine of 170 – 250 rpm capability equipped with a scrub brush or scrubbing pad (3M blue or equal). Equipment must be handled by trained, experienced personnel only. Lightly rinse and allow to dry. DO NOT flood the floor with rinse water, scrubbing or stripping solutions. Final re-washing, if required, and re-waxing will be done by the Owner.

3.6 **PROTECTION**

3.6.1 Prohibit traffic on floor finish for 48 hours after installation.

3.6.2 Following broom sweeping, protect new floors with 0.15 mm thick polyethylene cover and lay planking in all necessary traffic areas to minimize damage by other trades. Maintain until turnover.

3.6.3 Failure to adequately protect installed flooring resulting in unacceptable finish at time of turnover / final review will require the Contractor to fully replace all damaged areas at no expense to the Owner.

END OF SECTION

Part 1 General

1.1 Section Includes:

.1 Labour, Products, equipment and services necessary for painting Work in accordance with the Contract Documents.

1.2 References:

.1 CAN/CGSB 85.10, Protective Coatings for Metals.

.2 CAN/CGSB-85.100, Painting.

.3 Master Painters Institute (MPI), Painting Specification Manual.

.4 SSPC Steel Structures Painting Council, Standards.

1.3 Acceptable Manufacturers:

.1 Materials shall be premium produced by one of the following manufacturers:

.1 Dulux
.2 Pratt and Lambert Inc.
.3 Pittsburgh Paints (PPG) Manor Hall Series
.4 Benjamin Moore

1.4 Paint and Finish Schedule

.1 Prior to ordering materials submit paint finish schedule to the Consultant for approval. Schedule shall list materials to be provided, surface to be painted, room name and number, material name and manufacturer's colour chip sample.

1.5 Samples

.1 Submit two 100 X 200 mm colour chips of each paint colour to confirm colour match with approved paint and finish schedule.

.2 Prepare samples of each natural or stained finish; door finish (full size) and epoxy coated handrails.

.3 Prepare sample panels on permanent wall and ceiling areas for each paint system demonstrating first coat, second coat and third coat coverage.

.4 Sample panels shall remain until completion of painting at which time they shall be finished with full coats of paint. Do not proceed with paining until sample panels have been approved.

.5 Maintenance
Deliver to Owner's place of storage on completion of work, sealed containers of each finish painting material applied, and in each colour. Label each container as for original, including mixing formula. Provide the following:

.1 1 L of extra materials when less than 50 L are used for Project;
.2 3.78 L of extra stock when 50 to 200 L are used;
.3 7.57 L of extra stock when over 200 L are used.

Part 2 Products

2.1 Materials

.1 All materials under Work of this Section, including but not limited to, primers, stains, and paints are to have low VOC content limits.

.2 Materials shall be “top line” quality, supplied by a single manufacturer except for specialty products.

.3 Confirm gloss levels for all surfaces with ***consultant*** before starting work. Unless otherwise indicated allow for the following:

1 Ceiling: satin
2 Walls: semi-gloss
3 Trims, doors, and frames: semi-gloss
4 All other surfaces: semi-gloss

Part 3 Execution

3.1 General Requirements

.1 Apply painting systems in accordance with the MPI Painting Specification Manual. Apply each Product to manufacturer's recommended dry film thickness.

.2 Painting systems listed are required minimum, apply additional coats if necessary to obtain substrate hiding acceptable to the Consultant.

.3 Clean substrate surfaces free from, dust, grease, soiling, or extraneous matter, which are detrimental to finish.

.4 Patch, repair, and smoothen minor substrate defects and deficiencies e.g. machine, tool and sand paper marks, shallow gouges, marks, and nibs.

.5 Clean, sweep, and vacuum floors and surfaces to be painted, debris and dust- free prior to painting.

.6 Refer to MPI Painting Specification Manual for surface preparation requirements of

substrates not listed here.

.7 Apply paint uniformly in thickness, colour, texture, and gloss, as determined by the Consultant under adequate illumination and viewed at a distance of 1500 mm. Apply finishes free of defects in materials and application which, in the opinion of the Consultant, affect appearance and performance. Defects include, but are not limited to:
- .1 Improper cleaning and preparation of surfaces.
- .2 Entrapped dust, dirt, rust.
- .3 Alligatoring, blisters, peeling.
- .4 Scratches, blemishes.
- .5 Uneven coverage, misses, drips, runs, and poor cutting in.

.8 Paint behind surface mounted fixtures on walls and ceilings with full coats of paint.

.9 Paint inside of light coves white.

.10 Finish edges of doors to match face of door.

.11 Finish drawers on all sides.

.12 Paint tops, bottoms and edges of shelves with full coats, whether exposed or not.

.13 Paint interiors of ducts at grilles and diffusers with two coats of flat black paint.

.14 Paint exposed ductwork and piping in colours to match background wall or ceiling colour.

.15 Paint all gas piping with high visibility yellow-orange.

.16 Paint all roof top equipment and components including vent stack flashings and sleeve flashings but not including prefinished sheet metal flashing.

.17 White “Dryfall” spry finish. ceilings only as indicated in the drawings.

.18 Paint Zone Markings (walkway designation) Prepare surfaces in accordance with CAN/CGSB-85.100 acid etch.

3.2 Schedule of Interior Finish

.1 Gypsum Board (walls and partitions)
1 coat drywall primer tinted to base colour 2 coats latex enamel or latex acrylic

.2 Gypsum Board (ceilings and bulkheads) 1 coat drywall primer
2 coats acrylic latex semi-gloss

.3 Concrete and Concrete Block 2 coat block filler tinted
2 coats acrylic latex semi-gloss

.4 Metal, prime painted
spot prime with acrylic metal primer 2 coats acrylic semi-gloss

.5 Metal, zinc coated
1 coat acrylic metal primer 2 coats acrylic semi-gloss

.6 Woodwork, painted
1 coat alkyd or latex primer 2 coats acrylic latex enamel

.7 Woodwork stained and varnished (transparent finish) 1 coat stain
1 coat sand sealer, light sanding 1 coat polyurethane varnish, gloss.
1 coat polyurethane varnish, satin.

.8 Exposed piping, wrapped 1 coat block filler
2 coats acrylic semi-gloss

.9 Exposed piping and conduit, unwrapped 1 coat metal primer
2 coats acrylic semi-gloss

.10 Exposed Ductwork, insulated 1 coat block filler
2 coats acrylic semi-gloss

.11 Metal, epoxy coated 1 coat epoxy primer 1 coat epoxy gloss

.12 Existing walls to be primed and finished with 2 coats of latex semi-gloss
Trim to be 2 coats of gloss oil.

.13 Traffic Marking Paint. Evenly apply paint in two coats at the rate of 4.5L/10m2.

3.3 Cleaning

.1 Remove spilled, splashed, and spattered paint promptly as Work proceeds and on completion of Work. Clean surfaces soiled by paint spillage and paint spatters. Repair or replace damaged Work, as directed by Consultant.

3.4 Protection

.1 Post Wet Paint signs during drying and restrict or prevent traffic where necessary.

.2 Post sign, after Consultant's inspection and acceptance of each room, reading: PAINTING COMPLETE - NO ADMITTANCE WITHOUT CONTRACTOR'S PERMISSION.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Electrically operated fabric gymnasium divider.

B. Related sections:

1. Refer to Structural Drawings for Structural steel framing to support gymnasium divider.

2. Refer to Electrical Drawings for Electrical supply, conduit, and wiring for motorized gymnasium divider.

1.2 SUBMITTALS

A. Submit in accordance with Section 01300 Submittals

1. List of proposed products and product data.

2. Loads to be transmitted to building structural members and requirements for supplementary bracing and structural support members.

3. Shop drawings showing layout, elevations, dimensions, fabrication details, method of attachment and electrical wiring diagrams.

4. Manufacturer must provide calculations and reports for tests performed by an independent testing laboratory accredited by the American Association of Laboratory Accreditation (A2LA) that clearly demonstrate compliance with minimum safety factors included in product specifications.

5. Certificates for Divider Curtain Vinyl and Mesh to prove they meet the requirements of GreenGuard Gold.

6. Samples of fabric for selection by Architect.

7. Manufacturer's installation and maintenance instructions.

1.3 QUALITY ASSURANCE

A. Source limitation: All components including curtain, suspension system, electric winches, and controls for divider shall be products of a single manufacturer.

B. All welding to be performed by personnel having passed Welder Qualification testing in accordance with American Welding Society (AWS) code D1.1 or higher. Manufacturer to provide certification and test results upon request.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver divider until building is enclosed and other construction within gymnasium is substantially complete.

PARTS 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Draper®, Inc., 411 South Pearl Street, Spiceland, Indiana 47385-0425; 765-987-7999.

Contact: Steven Strazzabosco Technical Product Manager.
Forum Athletic Products Inc., 9 Browning Crt, Unit 1. Bolton, ON L7E 1G8
Ph: (905) 405-1222 ext 227 Fax: (905)405-8532

2.2 GYMNASIUM DIVIDER

***PARAGON G GYM DIVIDER*,**

A. Type: Electrically operated, roll-up gymnasium divider including motor, housing, and other components required for complete functional installation; ***Paragon G Gym Divider*** as manufactured by Draper, Inc.

B. Operation: Curtain rolled up and down by electrical motor-in-roller.

C. Configuration: Rectangular shape with straight bottom and extending across room as indicated on Drawings.

1. Dimension of stored divider: [13-1/4 inches] [34 cm].

2. Minimum required clearance between vertical curtain edges and adjacent fixed objects: [5 inches] [125 mm].

D. Operating mechanism: 6 inch (152 mm) metal roller powered with UL certified motor, rated 110-120V AC, 60 Hz, three wire, instantly reversible, lifetime lubricated with pre-set accessible limit switches.

E. Attachment: Attach to structural support with [1/2 inch] [13 mm] diameter threaded rods.

G. Bottom dowel: [1½ inches] [38 mm] diameter steel tube with black polyethylene endcaps.

H. Housing: Extruded aluminum 12 inches w by 13-1/4 inches h (30.5 cm by 33.7 cm) case fully enclosed except for 3-7/8 inch 9.8 mm) (slot allowing passage of divider curtain fabric. Provided with universal mounting brackets for wall, ceiling or above ceiling mounting.

I. Roller: 6 inches (152 mm) diameter steel tube. Curtain securely attached to roller at top and at bottom to weighted dowel.

J. UL Certification: Entire unit certified by Underwriters' Laboratories, Inc. for the U.S. and Canada. Suitable for use in environmental air space in accordance with Section 300-22 (c) of the National Electrical Code, and Sections 2-128, 12-010 (3) and 12-100 of the Canadian Electrical Code, Part 1, CSA C22.1. U.S. Patent No. 6,873,461.

3 CURTAIN

A. Full height curtain: Refer to drawings for dimensions.
Bottom curtain section: 2300mm Opaque solid vinyl coated polyester fabric.
Upper curtain section: 1022mm Vinyl coated polyester mesh.

1. Weight: 22 ounces per SY.

2. Resistant to rot, mildew, and ultraviolet light.

3. Flammability: Rated self-extinguishing in accordance with California State Fire Marshall Title 19.

4. Color: Dark Royal Blue Vinyl / Yellow Mesh.

B. VOC Emission: Divider Curtain Vinyl and Mesh to be low emitting and certified to meet all of the requirements of the GREENGUARD Gold certification program. GREENGUARD Gold requires emissions of total volatile organic compounds ≤ 0.22 mg/m^3, formaldehyde ≤ 0.0135 ppm, total aldehydes ≤ 0.043 ppm, individual volatile organic compounds ≤ 1/1000 TLV and ≤ ½ chronic REL and total phthalates ≤ 0.01 mg/m^3. Vinyl and Mesh must be evaluated to indoor air quality evaluation (IAQ) using a GREENGUARD product evaluation protocol following the requirements of The GREENGUARD Product Certification Program, ASTM Standard D5116 and the United States Environmental Protection Agency and modeled based on GEI requirements for a standard gymnasium loading and ASHRAE 62.1 – 2004 ventilation conditions. Manufacturer to provide certificate and/or test results upon request.

C. Top edge: Solid fabric in triple thickness and double welded to [mesh] [solid curtain fabric] to form [6 inches] [152 mm] wide pocket for top pipe batten.

D. Bottom edge cut square for attachment to roller pipe with aluminum stop strip.

2.4 CONTROLS

A. Provide key lock, 3-position, momentary contact wall control switch to lower, raise, and stop gymnasium divider. Provide with switch box and plastic cover plate.

operating system.
Control for up/down from one side with a key. The other side would just be a single on/off button that needs to be pushed to allow the key to operate. Refer to Electrical.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate support of gymnasium divider with roof structure to ensure proper distribution of loads and adequacy of attachment points. Ensure that building structure has been designed for loads of specific gymnasium divider to be provided.

B. Coordinate configuration, size, and installation of gymnasium divider with height, slope, and type of building structure and lighting fixtures, mechanical equipment, ductwork, fire-suppression system, bleachers, athletic equipment, and other potential obstructions.

C. Field verify dimensions prior to fabrication.

D. Coordinate electrical requirements for motorized operating mechanism to ensure proper power source, conduit, wiring, and boxes for keyed switches. Prior to installation, verify type and location of power supply.

E. For installations made after wood gymnasium flooring is installed, provide protection and exercise care not to damage flooring.

3.2 INSTALLATION

A. Install in accordance with manufacturer's written instructions and shop drawings.

B. Install even and level with curtain hanging 50 mm above floor in down position.

C. Install control switch such that operator has view of complete gymnasium divider during lowering and raising.

D. Adjust limit switches of electric winch to ensure accurate position in both stored and lowered positions.

3.3 TESTING AND DEMONSTRATION

A. Operate divider curtains to ensure proper lifting and lowering. Adjust as required to ensure smooth operation and accurate positioning.

B. Demonstrate to Owner's designated representatives complete operation and required maintenance.

END OF SECTION