

TECHNICAL SPECIFICATIONS FOR :

PROJECT: **MOUNT HOPE ELEMENTARY SCHOOL
RENOVATION & ADDITION**

ADDRESS: MOUNT HOPE, ONTARIO

CLIENT: HAMILTON-WENTWORTH DISTRICT SCHOOL BOARD

PROJECT No.: 24114

TENDER No.:

DATE: NOVEMBER 2025

BINDER: **A** **ARCHITECTURAL & STRUCTURAL**



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PROJECT NAME

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END OF SECTION

No. of Pages

SPECIFICATIONS BINDER “A”

THE BID DOCUMENTS

HWDSB Request for Tender Document

INTRODUCTORY INFORMATION

00 00 05	Consultants	1
00 00 10	Table of Contents	9

DIVISION 1- General Requirements

01 11 00	Summary of Work	27
01 22 00	Meetings and Progress Reports	3
01 33 00	Submittal Procedures	5
01 35 30	Health and Safety Requirements	4
01 35 43	Environmental Procedures	2
01 45 00	Quality Control	4
01 51 00	Temporary Utilities	3
01 52 00	Construction Facilities	3
01 56 00	Temporary Barriers and Enclosures	3
01 73 03	Execution Requirements	4
01 74 11	Cleaning	2
01 77 00	Closeout Procedures	2
01 78 00	Closeout Submittals	7
01 78 10	Sample Guarantee/Warranty form	2
01 91 00	Building Envelope Quality Control	3

DIVISION 2- Existing Conditions

02 10 00	Existing Site Photos	3
02 41 15	Selective Demolition and Removals	6
02 80 00	Designated Substance Report - Cover	1
02 81 00	Hazardous Materials – General Provisions	17
02 82 00.01	Asbestos Abatement – Type 1 (Low Risk) Procedures	4
02 82 00.02	Asbestos Abatement – Type 2 (Moderate Risk) Precautions	7
02 83 10	Lead Abatement – Class 1 Precautions	4
02 83 11	Lead Abatement – Class 2 Precautions	6

DIVISION 3- Concrete

03 10 00	Concrete Forms and Accessories	3
03 11 00	Landscape Concrete Formwork	3
03 32 00	Concrete Reinforcement	3
03 30 00	Cast in Place Concrete	10
03 30 01	Landscape Cast in Place Concrete	8

	<u>No. of Pages</u>
03 35 05 Concrete Floor Hardeners	3
03 40 00 Precast Hollow Core Slabs	6
 <u>DIVISION 4- Masonry</u>	
04 05 00 Masonry Procedures	4
04 05 00 Mortar and Grout	3
04 21 13 Masonry Veneer	8
04 22 00 Concrete Unit Masonry	12
 <u>DIVISION 5- Metals</u>	
05 10 00 Structural Metal Framing	6
05 30 00 Metal Decking	6
05 41 50 Lateral Load Bearing Metal Stud System	4
05 50 00 Metal Fabrications	7
 <u>DIVISION 6- Wood, Plastics and Composites</u>	
06 10 11 Rough Carpentry	6
06 40 00 Architectural Woodwork	9
06 47 00 Plastic Laminates	3
 <u>DIVISION 7- Thermal and Moisture Protection</u>	
07 11 13 Bituminous Waterproofing	8
07 21 13 Board Insulation	4
07 21 19 Foamed-In-Place Insulation	5
07 27 10 Air Barriers	4
07 41 43 Aluminum Composite Panels	6
07 46 13 Aluminum & Steel Siding	5
07 52 16 SBS Modified Bituminous Membrane Roofing	23
07 62 00 Sheet Metal Flashing and Trim	4
07 81 00 Applied Fireproofing	3
07 84 00 Fire Stopping	4
07 92 00 Joint Sealers	7
 <u>DIVISION 8- Openings</u>	
08 11 14 Steel Doors and Frames	15
08 11 15 Door Schedule	1+11
08 44 13 Glazed Aluminum Curtain Walls	10
08 50 50 Aluminum Windows	9
08 71 10 Finish Hardware – General	16
08 71 15 Finishing Hardware Schedule	1+44
08 80 50 Glazing	6

	<u>No. of Pages</u>
<u>DIVISION 9-Finishes</u>	
09 21 16 Gypsum Board Assemblies	8
09 22 16 Non-Structural Metal Framing	3
09 30 13 Ceramic Tiling & Terrazzo Repair	9
09 51 13 Acoustical Panel Ceilings	4
09 65 16 Resilient Sheet Flooring	5
09 65 19 Resilient Tile Flooring	5
09 68 00 Flocked Flooring - Carpeting	2
09 84 10 Acoustical Wall Treatment	5
09 91 22 Painting	8
09 91 27 Finishes and Colour Notes	2
09 91 30 Room Finish Schedule	1+6
<u>DIVISION 10- Specialties</u>	
10 11 25 Manufactured Specialties	6
10 14 10 Exterior Signage	6
10 21 20 Laminated Plastic Toilet Partitions	4
10 28 10 Washroom Accessories	6
10 43 70 Concrete Storage Unit	3
<u>DIVISION 11- Equipment</u>	
No items	
<u>DIVISION 12- Furnishings</u>	
12 21 16 Window Coverings	4
<u>DIVISION 13- Special Construction</u>	
No items	
<u>DIVISION 14- Conveying Systems</u>	
No items	
<u>DIVISION 21, 22, 23, 25 Mechanical</u>	
Refer to Specification Binder 'B'	
<u>DIVISION 26 Electrical</u>	
Refer to Specification Binder 'B'	
<u>DIVISION 31- Earthwork</u>	

	<u>No. of Pages</u>
31 09 15 Geotechnical Information	1
Geotechnical Investigation Report	Binder C
Phase 1 ESA	Binder C
31 14 10 Site Preparation	2
31 22 00 Landscape Grading	2
31 23 10 Excavating, Trenching and Backfilling	12
31 23 13 Rough Grading	4
31 25 00 Erosion and Sedimentation Controls	2
 <u>DIVISION 32- Exterior Improvements</u>	
32 01 90 Tree Preservation	2
32 12 17 Asphalt Paving	5
32 13 13 Concrete Paving and Edges	2
32 14 13 Precast Concrete Unit Paving	8
32 18 13 Synthetic Grass Surfacing	3
32 18 16 Play Surfacing	2
32 31 13 Chain Link Fences	2
32 31 19 Decorative Metal Fences and Gates	3
32 91 00 Topsoil and Finish Grading	3
32 92 23 Sodding	3
32 93 10 Trees, Shrubs and Groundcover Planting	8
32 94 13 Precast Maintenance Edge	5
32 94 20 Landscape Boulders	2
 <u>DIVISION 33- Utilities</u>	
33 05 14 Manholes and Catch Basin	3
33 11 17 Water Systems	4
33 11 17 Sanitary Sewers	3
33 44 00 Storm Sewers	4
33 46 00 Landscape Subdrainage	3
33 46 20 Foundation and Underslab Drainage	4

SPECIFICATIONS BINDER “B”

DIVISION 21, 22, 23, and 25 Mechanical
 Refer to Specifications Binder ‘B’

DIVISION 26 Electrical
 Refer to Specifications Binder ‘B’

SPECIFICATIONS BINDER “C”

ARCHITECTURAL DETAILS

Detail No.	Title
AD 200	Asphalt Details
AD 204	Concrete Curb at Finished Grade (Sod/Planting)
AD 205	Concrete Curb at Finished Grade (Asphalt)
AD 206	Depressed Curb Detail
AD 207	Concrete Sidewalk Details
AD 208	Roll Over Curb Detail
AD 210	Bollard Detail
AD 213	Light Standard
AD 214	Contractor Site Sign
AD 215	Job Site Sign
AD 218	Fire Route Gate - Single
AD 219	Fire Route Gate Details
AD 251	Pavement Marking Lines
AD 252	Pavement Marking Messages
AD 255	Directional Arrow Types
AD 256	Site Signage
AD 400	Firestopping Detail at Cavity Wall
AD 401	Exterior Cavity Wall Control Joint Detail
AD 411	Wall Control Joint Details Interior Side
AD 412	Brick Vent Details
AD 413	Date Stone
AD 451	Roof Scupper – New Addition
AD 455	Mechanical Curb Detail
AD 459	Vent Stack Detail
AD 460	Gooseneck Curb Detail
AD 461	Concrete Paver Detail
AD 502	Corridor Bottle Filler
AD 503	Bench Detail M5
AD 519	Roof Access Ladder to Library High Roof
AD 601	Cabinet Type B1- Lower Cabinet
AD 602	Cabinet Type B2 – Lower Sink Cabinet
AD 607	Cabinet Type B7 – Single Lower Cabinet
AD 608	Cabinet Type B8 – Lower Cabinet
AD 609	Cabinet Type B10 – Dishwasher Lower Millwork
AD 610	Cabinet Type B11 – Lower Cabinet with Drawers
AD 614	Cabinet Type B14 – Staff Room Island
AD 617	Cabinet Type B17 – Learning Commons Low Cabinet
AD 619	Cabinet Type B19 – Learning Commons Low Open Shelving
AD 622	Cabinet Type K2 – Cubbies & Benches
AD 626	Cabinet Type K6 – Child Care Washroom Diaper Storage
AD 628	Cabinet Type K8 – Child Care Cart Storage

	<u>No. of Pages</u>
AD 629	Cabinet Type K10 – Kindergarten Low Open Shelving
AD 631	Cabinet Type U1- Upper Cabinet
AD 632	Cabinet Type U2 – Single Upper Cabinet
AD 633	Cabinet Type U3- Upper Cabinet (Range Hood)
AD 634	Cabinet Type U4- Upper Cabinet (Microwave)
AD 640	Cabinet Type C1 – Teacher’s Closet
AD 641	Cabinet Type C2 – Tall Open Shelving
AD 645	Cabinet Type C5 – Tall Closet
AD 646	Cabinet Type K8 – Child Care Cart Storage
AD 725	Top of Wall Fire Separation Assembly
AD 800	Door Types
AD 801A	Hollow Metal Frames & Screens
AD 801B	Hollow Metal Frames & Screens
AD 802	Door Jamb Sections
AD 900	Radiant Panel Detail
AD 1000	Washroom Fixture Mounting Heights

DRAWING SET

ARCHITECTURAL DRAWINGS

SV1	TOPOGRAPHICAL SITE SURVEY
SD1	DEMOLITION SITE PLAN
SP1	SITE PLAN
CV-1	EROSION AND SEDIMENT CONTROL PLAN
CV-2	SITE SERVICING PLAN
CV-3	SITE GRADING PLAN
L100	LANDSCAPE PLAN
L200	LANDSCAPE PLAN
L300	LANDSCAPE DETAILS
L301	LANDSCAPE DETAILS
TP100	TREE INVENTORY AND PRESERVATION PLAN
A01	FIRE SEPARATION & OBC MATIX
A02	DEMOLITION GROUND FLOOR PLAN & RCP - ADDITION
A03	PROPOSED GROUND & SECOND FLOOR PLAN - ADDITION
A04	PROPOSED GROUND & SECOND FLOOR RCP - ADDITION
A05	DEMOLITION ROOF & SECOND FLOOR PLAN AND PROPOSED ROOF PLAN - ADDITION
A06	DEMO. & PROP. FLOOR PLANS AND RCP IN AREA OF RENOVATIONS
A07	DEMOLITION & PROPOSED CANOPY AT MAIN ENTRANCE
A08	PARTIAL DEMO. & PROP. GROUND FLOOR RCP
A09	EXTERIOR ELEVATIONS & BLDG SECTIONS
A10	WALL SECTIONS
A11	WALL SECTIONS
A12	WALL SECTIONS
A13	WALL SECTIONS
A14	PLAN DETAILS

No. of Pages

A15	SECTION DETAILS
A16	SECTION DETAILS
A17	STAIR PLANS AND SECTIONS
A18	INTERIOR ELEVATIONS - ADDITION
A19	CURTAIN WALLS, ALUMINUM SCREENS & WINDOWS SCHEDULE
A20	FLOOR PATTERN PLANS

STRUCTURAL

S0.0	COVER PAGE
S0.1	EXISTING RENOVATION PLAN
S1.0	FOUNDATION PLAN
S2.0	TYPICAL FOUNDATION DETAILS
S2.1	FOUNDATION SECTIONS
S3.0	SECOND FLOOR FRAMING PLAN
S3.1	ROOF FRAMING PLAN
S4.0	TYPICAL FRAMING DETAILS
S4.1	CROSS SECTIONS

MECHANICAL

M101	LEGEND, SCHEDULES & KEY PLANS
M201	EXISTING SCHOOL GROUND FLOOR - DEMOLITION PART PLANS
M202	EXISTING SCHOOL GROUND FLOOR - RENOVATION PART PLANS
M203	MECHANICAL ROOM PART PLANS & SCHEMATIC -DEMOM204 MECHANICAL ROOM PART PLANS & SCHEMATIC - RENO
M301	GROUND FLOOR ADDITION PLANS - DRAINAGE
M302	SECOND FLOOR ADDITION PLANS - DRAINAGE
M303	GROUND & SECOND FLOOR ADDITION PLANS - PLUMBING
M304	GROUND & SECOND FLOOR DEMOLITION & ADDITION PLANS - FIRE PROTECTION
M401	GROUND & SECOND FLOOR ADDITION PLANS - HEATING
M501	GROUND & SECOND FLOOR ADDITION PLANS -VENTILATION
M502	ROOF PLAN - ADDITION
M901	MECHANICAL DETAILS

ELECTRICAL

E01	LEGEND & ELECTRICAL DEMOLITION SITE PLAN
E02	ELECTRICAL RENOVATION SITE PLAN & SITE DETAILS
E03	DETAILS & SCHEDULES
E04	LIGHTING CONTROL DETAILS & SEQUENCE
E05	OVERALL KEY PLAN AND GROUND FLOOR PART PLANS -DEMOLITION AND RENOVATION
E06	GROUND & SECOND FLOOR PART PLAN - LIGHTING
E07	GROUND & SECOND FLOOR PART PLAN - POWER & SYSTEMS
E08	ROOF PART PLAN - POWER & SYSTEMS
E09	SINGLE LINE DIAGRAM & PANEL SCHEDULES
E10	FIRE ALARM RISER DIAGRAM & PASSIVE GRAPHIC
E11	AUXILIARY SYSTEMS RISERS DIAGRAMS

Part 1 General

1.0 SECTION INCLUDES

- 1.1 Precedence
- 1.2 Contract
- 1.3 Relations of Trades
- 1.4 Additional Drawings
- 1.5 Existing Site Conditions & Drawings
- 1.6 Work Within an Existing Occupied Building
- 1.7 Construction Sequencing
- 1.8 Temporary Construction Fencing
- 1.9 Contractor Parking
- 1.10 Bylaws, Permits and Approvals
- 1.11 Organization
- 1.12 Seismic Design Requirements
- 1.13 Canadian Products and Local Labour
- 1.14 Materials and Workmanship
- 1.15 Quality Control
- 1.16 Overtime
- 1.17 Protection of Other Work
- 1.18 Fastenings
- 1.19 Supply and Install
- 1.20 Occupation Before Completion
- 1.21 General Requirements
- 1.22 Coordination
- 1.23 Access to the Project
- 1.24 Subtrade Awards
- 1.25 Safety Data Sheets
- 1.26 Regulating Documents
- 1.27 General Contractor's Responsibilities
- 1.28 Manufacturers' Instructions
- 1.29 Air and Vapour Seal
- 1.30 Fire Safety
- 1.31 Construction Safety
- 1.32 Independent Tests and Inspections
- 1.33 Periodic Cleaning
- 1.34 Temporary Protection
- 1.35 Completion
- 1.36 Guarantees
- 1.37 Contingency Allowance
- 1.38 Cash Allowances
- 1.39 Allowances Carried in Divisions 15 and 16
- 1.40 Schedule of Allowances
- 1.41 Polychlorinated Biphenyl (PCB)
- 1.42 Use of Consultant's Digital Drawings
- 1.43 Building Dimensions
- 1.44 Setting of the Work & Required Surveys
- 1.45 Layout of Work
- 1.46 Documents Required: Start, During & Close Out.

1.1 PRECEDENCE

- .1 This Section contains Articles prepared which represent the Board standards and policies. In all cases this Section is intended to be read in conjunction with and to coordinate with all other Sections. In the case of discrepancy between this Section and other Sections to more stringent Articles of any applicable Section shall apply.

1.2 CONTRACT

- .1 Construct the Work under a single, lump sum, Stipulated Contract. The form of Contract is the CCDC2-2020 plus Supplementary Conditions attached to these specifications
- .2 Contract includes the construction of a two storey addition to an existing elementary school, including site work and coordination. Location of the work is 9149 Airport Road, Mount Hope, ON L0R 1W0.
- .3 Project Occupancy Requirements
 - .1 It is the requirement of this Contract that the addition and renovation of this existing elementary school, which is to be contracted and completed under the terms of this contract, be Substantially Complete and fit for full legal occupancy not later than the date outlined in the School Board's contract documents.
- .4 Cautionary Note
 - .1 Bidders, both General Contractors and Subcontractors, are cautioned that they should not submit bids or tenders if they are unsure of their ability to comply with the above stated construction/occupancy schedule and requirements, provide overtime work as necessary and/or are unwilling to be bound by the schedule and Provisions described in these documents.

1.3 RELATIONS OF TRADES

- .1 The Contract Specifications have been generally divided into trade sections for the purpose of ready reference.
- .2 The Contractor is responsible for coordinating all trades. He is solely responsible for determining the lines of demarcation between 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.
- .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.

1.4 ADDITIONAL DRAWINGS

- .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.

1.5 EXISTING SITE CONDITIONS & DRAWINGS

- .1 Refer to geotechnical report in Binder C for existing soil information and construction requirements.
- .2 Refer to Drawings for additional grading, removals, new driveways and service connections and reinstatement for areas beyond property lines and coordinate Permit requirements with this section.
- .3 At the outset of the contract and before any other work begins, the contractor shall review grades on site to confirm compliance with the contract documents. Failure to do so at this initial stage shall eliminate the contractor's right to make claim regarding incorrect grades or site surface conditions at any later stage for the work.
- .4 Contractor is responsible to quantify all on-site material to achieve design grades and is responsible for the importation or exportation of material from the site as required.
- .5 Ascertaining the specific site and building conditions as they relate to the project is the responsibility of the contractor. Notwithstanding this overriding responsibility the consultant has made every effort to properly represent existing site conditions as they are evident at the time of tender.
- .6 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. All excavation, stockpiling, removal, importing and/or grading of soils is to be included in the work of this Contract. Refer to site plan drawings. The contractor shall also refer to the recommendations of the soils investigation records which are included for information and report any discrepancies in manner described in the bid documents, prior to submitting a tender.
- .7 Inspection of the site during the 'Site Walkthrough' is strongly recommended. All Bidders are required to understand the scope of the Work and site conditions before delivery of their Tender.
- .8 Minor adjustments to the level of sodded areas, berms, etc., may be permitted, to the prior approval of the Consultant and School Board. It must be stressed that it will be the contractor's responsibility to negotiate and obtain approval for any such changes with the Authorities having Jurisdiction over lot grading approvals for this project. Completion delays due to such approvals shall not be entertained.
- .9 Refer to the Soil Characterization information provided in Binder C for any exceedances of tested material. The cost of any required disposal is the Contractor's responsibility.

1.6 WORK WITHIN AN EXISTING OCCUPIED BUILDING

- .1 The contractor is reminded that work to this project will be performed while occupants are present at the facility. Access restrictions to portions of the work apply. Therefore, precise scheduling and sequencing of the various work areas is required.
- .2 At all times it is the School Board and School Administration who is the authority responsible for the well-being of the facility occupants. As such, the Contractor's Site Superintendent must establish a working rapport with the School Board and School

- Administration or their designee, suitable to provide daily notification of proposed construction timing and activities.
- .3 Connection of any services must be made in such a way that it leaves no disturbance to materials or systems, nor any exposed construction conditions within the operating facility area.
 - .4 Catering trucks are not permitted on the site whatsoever.
 - .5 During the school year, contractors are required to find parking off-site. School parking area is being utilized by school staff during this period.
 - .6 The Contractor shall minimize nuisances to the facility operation such as loud noise, percussion sounds from power tools, dust, odours. Due to noxious fumes, roofing and asphalt paving shall be done after hours (after 4:00 p.m., or during the weekends). Hot asphalt kettles may not be heated until after 4:00 p.m. on weekdays without prior permission from the School Board Owner, School Administration and Architect.
 - .7 *Refer also to the HWDSB RFT documents, and Section 01 56 00- 'Temporary Barriers and Enclosures'*

1.7 CONSTRUCTION SEQUENCING:

- .1 Basic Scope outline
 - .1 Project award.
 - .2 **February 2026:** Shop drawings and ordering of materials
 - .3 **Phase 1 – March Break 2026 to February 2027**
 - .1 Construction Access & Hoarding (Exterior and Interior)
Install tree protection and construction hoarding during the week of March Break 2026
 - .2 Addition Construction
 - .4 **Phase 2 – July & August 2026 (Summer 2026)**
 - .1 Interior Renovation, site grading & asphalt work.
 - .5 Work to be Substantially Performed by the required date for occupancy in the RFT documents.
 - .6 Following Substantial Performance complete deficiencies to renovations to the existing building such that project Total Completion is achieved by the required date.
- .2 Coordinate sequencing with all trades and advise sub-trades of these sequencing requirements prior to the close of Tenders.

1.8 TEMPORARY CONSTRUCTION FENCING

- .1 A temporary perimeter chain link construction fence and siltation fencing shall be erected by the awarded contractor in advance of work and is to be maintained for the duration of the work until such time as new fences, if any as shown, are installed. Provide lockable truck access gates and man gates and maintenance of the entire fence as part of the work of this contract.
- .2 Ensure for the duration of the contract that surrounding the work site, the construction fencing, siltation fencing and man and truck gates, are provided and maintained. This

fence shall be locked when no work is in progress and located as shown on the site plan drawing.

- .3 The Board insists that the installation of this construction fencing be accomplished as the first task of the General Contractor upon project commencement.
- .4 In addition, should the sodded play areas not be completed a minimum of 6 weeks prior to school occupancy, the contractor shall be responsible for the erection and maintenance of a temporary, leased, perimeter “Mod-U-Lock” fence around the sodded areas for a minimum of 6 months from sod being laid, at no additional cost to the School Board.

1.9 CONTRACTOR PARKING

- .1 Refer to section 01 52 00 Construction Facilities.

1.10 BYLAWS, PERMITS AND APPROVALS

- .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.
- .2 Work of this Contract must conform with such laws, by-laws and/or regulations. Any required variation to, or deviation from, the drawings and specifications, shall be performed in accordance with the CCDC-2 Contract and Supplementary Conditions to the CCDC -2 contained in these specifications.
- .3 Furnish inspection certificates and/or permits as may be applicable as evidence that the installed Work conforms with laws, by-laws and regulations of Authorities Having Jurisdiction.
- .4 Each subtrade shall obtain and pay for all permits and licenses required by Municipal, Provincial, or other authorities having Jurisdiction, particular to their trade.
- .5 It is the final responsibility of the General Contractor to obtain all the required approvals and permits and include in his Total Stipulated Price, the cost of such approvals, permits and fees. The only exception is the Building Permit and the Site Servicing permit, which will be applied for by the Consultant and paid for by the Board. It is the contractor’s responsibility to include in the base tender amount any additional permit or connection fees not specifically identified in the Cash Allowance, and to provide any deposits or securities required by Authorities Having Jurisdiction.
- .6 Any revisions or deviations to Contract Documents required by any Authorities Having Jurisdiction must be reviewed by the Consultants before implementation.
- .7 In addition to the above requirements, it is the General Contractors responsibility to apply for, pay for and obtain Sprinkler Installation Permit including seismic bracings.

1.11 ORGANIZATION

- .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.

- .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.
- .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.
- .4 Before starting 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 affects 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.
- .5 Should any Subcontractor start their own work without such notification, it shall be construed as an acceptance by him of all preceding work and as a waiver of all claims or questions as to its suitability for receiving their work.

1.12 SEISMIC DESIGN REQUIREMENTS

- .1 This project requires adherence to seismic design requirements as stipulated in OBC 2006, Div. B, Part 4. The General Contractor shall be responsible to coordinate all disciplines to ensure compliance with these requirements for all applicable building components.
- .2 All disciplines including Mechanical & Electrical shall make reference to individual specification section and the seismic lateral load table on Drawing S01 which outlines components requiring compliance with seismic design.
- .3 As a minimum standard, design for all connections to meet seismic forces shall be included in base bid whether specifically stated in specific specification sections or not.
- .4 Shop drawings shall clearly include seismic design compliance calculations for all building components within scope of OBC 2006, Div. B, Part 4 requirements.
- .5 Refer to Structural Drawing for a table of applicable building components and Section 13 05 41 – 'Seismic Restraint for Non-structural Components'.

1.13 CANADIAN PRODUCTS AND LOCAL LABOUR

- .1 To the extent that the same are available and consistent with the proper economy and expeditious completion of the Contract, Canadian equipment, materials, products and other such applicable items are preferred by the Board to be used in the Work, wherever possible and practical.

1.14 MATERIALS AND WORKMANSHIP

- .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.

- .2 All work performed under this 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.
- .3 The acceptance of any materials or workmanship shall not be a bar to their subsequent rejection, if found defective.
- .4 Adequate, dry storage facilities shall be provided and all stored materials shall be protected from damage and theft.
- .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.
- .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.
- .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.
- .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.
- .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.
- .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 this regard, request clarification from the Consultant before proceeding with the Work.
- .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.
- .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.
- .13 Verify lines, levels and dimensions and report any errors or inconsistencies on the drawings to the Consultants.
- .14 Final responsibility of satisfactory completion of all the Work, however, lies with the General Contractor.

1.15 QUALITY CONTROL

- .1 Refer also to Section 01 45 00.

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- .2 The Consultants and authorized Board staff shall have access to all areas of the Work, including any off site construction facilities.
 - .3 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.
 - .4 If the General Contractor 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.
 - .5 The Consultants or the authorized Board Staff 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.
 - .6 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 reinspection.
 - .7 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 reinspect incorrectly installed sewer lines.)
 - .8 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.
 - .9 The General Contractor shall remove all defective work, whether the result of poor workmanship by their own employees or their subtrades, 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.
 - .10 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 Consultant.
 - .1 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.

1.16 OVERTIME AND OVERTIME SCHEDULING

- .1 The General Contractor must include in the Total Stipulated Tender Price, all costs for overtime work which may be necessary to complete the various portions of the Work, in accordance with the Completion Dates specified in the *Stipulated Price Bid Form*. The Board shall not entertain requests for any payments in connection with overtime work that may be required by the General Contractor, or any of their subtrades, in order to comply with the above referenced dates.
- .2 Similarly, it is the Contractor's responsibility to ensure, prior to the close of tenders that all subtrades will meet the requirements for overtime, as required, with no additional costs to the School Board, in order to meet the Completion Dates specified in the Form of Tender.
- .3 The contractor shall recognize the critical importance that the schedule for full occupancy must be met by the dates stated in the *Stipulated Price Bid Form*. Note that local by-laws may be enforced restricting morning and evening and Sunday work hours.
- .4 Note that at no time will the Board entertain additional charges or claims from the General Contractor or subcontractors for premium, overtime or after-hours work.
- .5 Only claims for scope changes or conditions beyond the control of the Contractor may be submitted for review by the Consultants and must be submitted and accepted in advance of the work taking place and at the outset of the condition or scope change arising. No claims additional charges or delays will be accepted if not reviewed and formally accepted in advance.
- .6 Notwithstanding sentence 5 above, for any work that remains incomplete after school occupancy by students, all access and work shall be restricted as described in the RFT documents.

1.17 PROTECTION OF OTHER WORK

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

1.18 FASTENINGS

- .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.

- .2 Exposed fastenings must be evenly spaced, neatly laid out and must not mar surfaces of prefinished materials.
- .3 No ram-setting or similar techniques will be permitted, without prior written approval of the Consultant.

1.19 SUPPLY AND INSTALL

- .1 Unless specifically noted, “*supply only*”, any reference to supply intends the **supply and installation** of material or item so noted.

1.20 OCCUPATION BEFORE COMPLETION

- .1 If the General Contractor, for any reason, does not have the Project completed by the specified completion date and the Board, of necessity, is forced to occupy any part of the building before the whole of the Work is completed, the Contractor will not be entitled to any indemnity for interference with the operation.

1.21 GENERAL REQUIREMENTS

- .1 All Contractors shall examine carefully all drawings and specifications to inform themselves fully of all conditions and limitations pertaining to the work of the contract.
- .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.
- .3 The responsibility and costs for all work, including temporary structures, shoring, shoring design (if applicable) 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.
- .4 The undertaking of period 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.
- .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.

1.22 COORDINATION

- .1 The General Contractor shall coordinate all work and preparation on which subsequent work depends to facilitate mutual progress, and to prevent any conflict.
- .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 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.
- .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.
- .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.
- .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, unless impractical and where required, cutting shall be done by each respective trade, and patching shall be done by the general contractor.

1.23 ACCESS TO THE PROJECT

- .1 The General Contractor for this Work shall, at all times allow the Consultants, the Board, or any other Board commissioned contractor or their employees, access into the building or around the premises, undisturbed, whether union or non-union, as may be required in the execution of other portions of the building work and installation of equipment, etc.
- .2 The General Contractor shall cooperate fully with any and all Board commissioned Contractors.

1.24 SUBTRADE AWARDS

- .1 The Contractor shall, on notice of award of the contract, obtain the Consultants approval of a complete list of all persons or firms to which they proposes to sublet any part of the work, the trades or divisions of work which are to be sublet to each, and the amount of each trade. The General Contractor shall provide to the Consultant a financial breakdown showing all divisions of the work amounting to the full sum of the contract. Mechanical and Electrical trades shall be further broken down as specified in Divisions 26 and 33.

1.25 SAFETY DATA SHEETS

- .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:
 - .1 Lead-free solder
 - .2 Resilient flooring
 - .3 Painting and finishing
 - .4 Fertilizers
 - .5 Glues and adhesives
 - .6 Pesticides

- .7 Herbicides
- .8 Any other product which may give off air borne particles after installation.
- .9 Sealants and caulking
- .2 The General Contractor and all 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.
- .3 The General Contractor must submit Certificates of Compliance, prior to the application for Substantial performance, for each of the following items:
 - .1 An affidavit relative to the use of Lead-free solder for all domestic water lines, regardless of location.
 - .2 Products for which Material Safety Data Sheets have been submitted and accepted.
 - .3 Other Work/Products identified in the Contract Documents as requiring a Certificate of Compliance.
- .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.
- .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.
- .6 Each Certificate of Compliance must be endorsed by the General Contractor with their authorized stamp/signature.
- .7 The Completion Security Account will not be paid to the Contractor without submission of all required affidavits and requested material and Safety Data Sheets.

1.26 REGULATING DOCUMENTS

- .1 The General Contractor and all Subcontractors, Suppliers/Installers etc., must conform to the latest editions in force at the time of tender of each and all of the following: Ontario Building Code, Canadian Electrical Code (CEC), 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 hoarding, scaffolding and shoring, formwork and falsework for concrete.
- .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.
- .3 Provide, on site, copies of documents referred to in the Specification for joint use of Contractor and Consultant.

1.27 GENERAL CONTRACTOR'S RESPONSIBILITIES

- .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 he who is 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.
 - .1 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.
 - .2 All equipment shall be in safe operating condition and appropriate to the task.
 - .3 The General Contractor is responsible to ensure only competent personnel be permitted on site. The General Contractor is to remove from the site any persons not observing or complying with safety requirements.
 - .4 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.
 - .5 The General Contractor shall supply competent personnel to implement the safety program and ensure that all Subcontractors comply with the Board's standards, and those of the Occupational Health and Safety Act.
 - .6 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.
 - .7 The Board may hire Commissioners to perform inspections of building systems at the closing stages of the work of this contract. If so contracted and identified in the *Instructions to Bidders*, the General Contractor shall cooperate with and coordinate the work of the Board's Commissioners on site.
 - .8 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.
 - .9 The General Contractor will include all provisions of this contract in any agreement with Subcontractors and hold them equally responsible for safe work performance.
 - .10 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.
 - .11 A Commissioning Agent has been assigned to the Project by the School Board.

1.28 MANUFACTURERS' INSTRUCTIONS

- .1 Unless otherwise specified, the General Contractor and all their Subcontractors shall comply with manufacturer's latest printed instructions for materials and installation methods.
- .2 The General Contractor shall notify the Consultant in writing of any conflict between the Specifications and Manufacturer's Instructions and have same clarified.

1.29 AIR AND VAPOUR SEAL

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

1.30 FIRE SAFETY

- .1 The General Contractor and all of their Subcontractors must comply with requirements of the Ontario Fire Code.
- .2 The appropriate clauses of the Ontario Building Code relating to fire protection shall be strictly followed.
- .3 The General Contractor shall provide and maintain free access to temporary or permanent fire hydrants acceptable to local fire department.

1.31 CONSTRUCTION SAFETY

- .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 Occupational Health and Safety Act (OHSA) (O. Reg. 213/91: Construction Projects, the regulations of the Ontario Department of Labour, Ontario Hydro Safety Requirements shall be strictly enforced. In event of conflict between any provisions of above authorities the most stringent provisions will apply.
- .2 The General Contractor is reminded, once again, that it is he who is responsible for Occupational Health and Safety on this Project. The items listed below are only guidelines of the Board's expectations in this regard and not to be construed to be comprehensive or total in nature.
- .3 The Board will take every reasonable precaution to prevent injury or illness to students, employees and the public, participating in Board activities, or performing their duties. This shall be accomplished by providing and maintaining a safe, health working environment by providing the education necessary to perform these activities or duties safely.
- .4 The Board is vitally interested in the health and safety of all Contractors and their workers performing work for the Board. Cooperation and support of the General

Contractor in the protection of workers from injury or occupational disease is a major, continuing object of the Board. To achieve these goals, the Board, in concert with the Contractors, will endeavor to make every effort to ensure that the Contractors provide a work site which is a safe and healthy work environment. The Board insists that all Contractors and their workers are dedicated to the continuing objective of reducing risk and injury.

- .5 The General Contractor covenants and agrees to comply with all statutory and other obligations, including, without limitation, the provisions of the Occupational Health and Safety Act (Ontario) and all Regulations thereto.
- .6 Without limiting the foregoing, for the purposes of this Contract, the General Contractor agrees that he shall be the “constructor” of the Project within the meaning of the Act, and as such, shall assume all the obligations and responsibilities, and observe all construction safety requirements and procedures, and duties of inspection imposed by the Act on the “constructor”, as therein defined, for all work and services performed by the General Contractor, Subcontractors and Other Contractors on or in connection with the Project.
- .7 The General Contractor shall inform and instruct Other Contractors that they, while performing work on this project, are under the authority of the General 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.
- .8 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.
- .9 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.
- .10 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.
- .11 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.
- .12 Every worker must protect their own health and safety by working in compliance with the law and with safe work practices and procedures established by the authorities having jurisdiction.
- .13 All sections of the Occupational Health and Safety Act for Industrial Establishments, 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.

- .14 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.
- .15 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.
- .16 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.
- .17 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.

1.32 INDEPENDENT TESTS AND INSPECTIONS

- .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:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of mechanical and electrical equipment and systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Re-testing as already described in *Quality Control* of this Section.
- .2 The Consultant will authorize payment of inspection services from specified cash allowances.
- .3 The General Contractor shall furnish labour and facilities to:
 - .1 Provide access to work to be inspected and tested.
 - .2 Facilitate inspections and tests.
 - .3 Make good work disturbed by inspection and test.
 - .4 Pour concrete test cylinders and store as directed by Inspection Firm.
- .4 The General Contractor shall notify Inspection Firms sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

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

1.33 PERIODIC CLEANING

- .1 Refer also to Section 01 74 11.
- .2 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:
 - .1 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.
 - .2 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.
 - .3 Schedule cleaning operations so that resulting dust and other contaminants do not affect wet, newly painted surfaces.
 - .4 In preparation for Substantial Performance and Occupancy, conduct inspections of all exposed interior and exterior surfaces.
 - .5 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from all exposed interior and exterior finishes, including glass and other polished surfaces.
 - .6 Remove all protective film from switch plates and hardware, particular kick plates.
 - .7 Clean lighting reflectors, lenses and other lighting surfaces.
 - .8 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 this Contract. Inspect for damages and make good.
 - .9 Remove debris and surplus materials from the roof areas and accessible concealed spaces.
 - .10 Replace heating, ventilation and/or air conditioning filters through the entire building to the extent that they supply or return from the work areas, whether or not, the units were operated during construction operations.
 - .11 Refer to “cleaning” sections of the specifications for additional specific periodic and final clean up requirements.
- .3 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.
- .4 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 this requirement will result in the contractor stripping these floors in their entirety.
- .5 The contractor shall also ensure that the appropriate measures including a stone mud mat are installed and maintained at all construction entrances, to avoid contamination of City roads and sewers. It is the Contractor’s responsibility and not the Board’s to ensure that

site entrances and roadways in front of the site are maintained in clean condition acceptable to the municipality or Subdivision Engineer, as the case may be for un-assumed subdivisions.

1.34 TEMPORARY PROTECTION

- .1 Refer also to Articles 1.6, in this Section.
- .2 The General Contractor to 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.
- .3 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.
- .4 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 to all work in progress and to any materials, products, tools, equipment, or other such items left at the work site.
- .5 Properly protect floors and roofs from any damage. Take special precautions when moving heavy loads or equipment over floors and roofs.
- .6 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.
- .7 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.
- .8 Protect glass and other finishes against heat, slab and weld splatters, using appropriate protective shields and covers.
- .9 The General Contractor must provide and maintain, in good working order, appropriately labeled ULC fire extinguishers, to the approval of Authorities Having Jurisdiction.
- .10 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.

1.35 COMPLETION

- .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.

- .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*.

1.36 GUARANTEES

- .1 The following is a summary of the guarantees (in number of years) required by the contract. Refer to individual specifications sections for additional information on warranties. In the event an extended warranty is listed in the specific Section, that section will have precedence over this list. If no extended warranty is listed, this list will govern:

.1	Entire Building, General Contract	1
.2	Paving	2
.3	Finish Carpentry	2
.4	Sprayed-In-Place Urethane Insulation	2
.5	Precast Structural Concrete	5
.6	Caulking	2
.7	Aluminum Composite Metal Panels	5
.8	Aluminum Windows & Window Walls (manufacturer's)	5
.9	Glazed Sealed Units	10
.10	Finish Hardware	3
.11	Panic Devices and Door Closers	5
.12	Acoustic Ceilings	2
.13	Built Up Roofing (installation)	2
.14	Built Up Roofing (manufacturer's)	10
.15	Sheet Metal Flashing and Siding	5
.16	Concrete Floors	3
.17	Ceramic Tile	3
.18	Painting	2

- .2 The guarantee period shall start on the date of issue of the Certificate of Substantial Performance of the Contract by the Consultant.

1.37 CONTINGENCY ALLOWANCE

- .1 Refer to the RFT contract documents for allowance requirements, if any.

1.38 CASH ALLOWANCE

- .1 Include in the Contract Price, a stipulated sum Cash Allowance in the amount of **One hundred and fifty thousand dollars, (\$150,000.00)**.
- .2 Cash Allowance, unless otherwise specified, cover the net cost to the General Contractor of services, products, construction, machinery and equipment, freight, handling, unloading, storage installation and other authorized expenses incurred in performing the Work.

- .3 The Contract Price, *and not the Cash Allowance*, includes the General Contractor's profit and coordination costs in connection with all Cash Allowance expenditures.
- .4 The Contract Price will be adjusted by written order by the Consultant to provide for an excess or deficit to each Cash Allowance. Any unused portions of these allowances shall be returned to the Board on the conclusion of the Contract.
- .5 A schedule shall be prepared jointly by the Consultant and the General Contractor to show when items called for under Cash Allowance, so that the progress of the Work is not delayed.
- .6 Exclusive of Deposits, which are the contractor's sole responsibility to provide as required of Authorities Having Jurisdiction, the following is a summary of the scope Cash Allowances to be included in the contract:
- .7 Expend the Cash Allowance as directed by the Consultant in writing. Allowance will be adjusted to actual cost with no adjustment to Contractor's charges. Cash expenditure must identify the H.S.T. separately.
- .8 **Cash Allowance - General**
 - .1 Interior Signage (supply and install)
 - .2 Incoming Gas Service
 - .3 ESA plan review
 - .4 Aiphone safe entry system (items in addition to any equipment noted in electrical specifications)
 - .5 Site Servicing Permit (if required)
 - .6 Pest Control (if required)
 - .7 Additional Fire Route & Traffic Signs (additional to those noted in specifications if required by municipal inspector)
 - .8 Various appliances (with exception of dishwasher noted in specifications)
 - .9 Learning Commons Circulation/Reception Desk
 - .10 Additional playground painting on asphalt play area
 - .11 Completion Site Survey by OLS
 - .12 All Inspections and Testing (requested by Consultants, Owner or Authorities)

1.39 ALLOWANCES CARRIED IN DIVISIONS 15 AND 16

- .1 No Additional Cash Allowances are included in the work of Divisions 15 and 16.

1.40 SCHEDULE OF ALLOWANCES

- .1 Material Allowances shall include the following:
 - .1 Net cost of Material
 - .2 Applicable taxes and duties
 - .3 Delivery to site
- .2 For Material Allowance, the contract shall include:

- .1 Handling at site, including unloading, uncrating, storage and hoisting
- .2 Protection from elements, from damage
- .3 Labour, installation and finishing
- .4 Other expenses required to do cash allowance work (i.e. contract co-ordination)
- .5 Overhead and profit
- .3 Material and Installation Allowances shall include the following:
 - .1 Net cost of material
 - .2 Applicable taxes and duties
 - .3 Deliver to site
 - .4 Handling at site, including unloading, uncrating, storage and hoisting
 - .5 Labour, installation and finishing

1.41 POLYCHLORINATED BIPHENYL (PCB)

- .1 Conform to the Environmental Protection Act and Regulations, Ontario Regulation 11/82 as amended.

1.42 USE OF CONSULTANTS'S DIGITAL DRAWINGS

- .1 Where a contractor wishes to obtain a digital copy of consultant drawings for shop drawings or survey purposes, the consultant may elect to provide this drawing for a nominal fee. As this is the consultants' option, the contractor shall not anticipate provision of these digital drawings to meet the contract schedule.

1.43 BUILDING DIMENSIONS

- .1 Ensure that all necessary job dimensions are taken and all trades are co-coordinated for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for co-ordination.
- .2 Verify that all work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by requirements of the drawings, and ensure that work installed in error is rectified before construction resumes.
- .3 Check and verify all dimensions referring to the work and the interfacing of all services. Verify all dimensions, with the trade concerned when pertaining to the work of other trades. Be responsible to see that Subcontractors for various trades co-operate for the proper performance of the Work.
- .4 Avoid scaling directly from the drawings. If there is ambiguity or lack of information, immediately inform the Consultant. Be responsible for any change through the disregarding of this clause.
- .5 All details and measurements of any work which is to fit or to conform with work installed shall be taken at the building.
- .6 Advise Consultant of discrepancies and if there are omissions on drawings, including layout of items which affect aesthetics, or which interfere with services, equipment or surfaces. DO NOT PROCEED without direction from the Consultant.

- .7 Prepare interference drawings AND SUBMIT AS SHOP DRAWINGS IN ADVANCE OF PRODUCTION to properly co-ordinate the work in all ceiling spaces and where necessary. Coordinate these drawings with all Divisions. Refer also to Section 013300.

1.44 SETTING OF WORK AND REQUIRED SURVEYS

- .1 As part of the base tender amount, provide and pay for the services of a Land Surveyor acceptable to the Consultant, registered in the Province of Ontario to establish the property boundaries and the location of the building addition.
- .2 Lay out building lines for the work and provide substantial stakes, batterboards or monuments to preserve lines and levels.
- .3 Verify on the site all grades, lines, levels, dimensions and location of hydrants, existing structures, manholes, overhead and buried utilities, existing trees, roadways, sidewalks and the like, shown on the drawings, and report omissions, errors, or inconsistencies, before commencing work.
- .4 Upon completion of layout work and before commencement of any excavation, give ample notification to allow for inspection of lines and levels. Such inspection does not in any way mitigate the Contractor's responsibility for accuracy of layout.
- .5 Provide the consultant with a Surveyor's Certificate describing the location of all perimeter foundation walls relative to property lines before construction proceeds on those walls.

1.45 LAYOUT OF WORK

- .1 Layout work with respect to the work of all trades. Arrange mechanical and electrical work such as piping, ducts, conduits, panels, equipment and the like to suit the architectural and structural details.
- .2 Alterations necessary due to conflict and interference between trades, to be executed at no cost to the Owner unless notification is given in writing before Tender Closing Date.

1.46 DOCUMENTS REQUIRED AT START, DURING & CLOSE-OUT OF CONSTRUCTION

- .1 At Commencement of Contract
- .1 Supply Performance Bond and Labour and Material Bond, in accordance with RFT document.
- .2 Supply Certificate of Insurance as identified in the RFT document.
- .3 Supply Certificates of good standing from WSIB for the General Contractor and all Subcontractors.
- .4 Supply a complete Contract Sum Breakdown of all subtrades or parts of work and general expense items for approval by all consultants. Include Mechanical and Electrical Breakdowns for review and acceptance by Consultants.
- .5 Supply a competent detailed Construction Schedule that has been reviewed and approved by major subtrades. Identify critical milestone dates.
- .6 Supply Cash Flow schedule of monthly progress payments in coordination with the Construction Schedule and plot as 'S' curve chart.

-
- .7 Supply Schedule of Shop Drawing Submissions and identify list of long-lead items.
 - .8 Apply for and post and supply a copy of Notice of Project.
 - .9 Supply a copy of Health & Safety policy as well as post at the job site.
 - .10 Supply Shoring Designs of all load bearing areas if any required of the construction sequence or if required by the Structural Engineer.
 - .11 Supply interference drawings for all areas requested by the Architect, Mechanical Engineer or Electrical Engineer.
 - .2 During Construction
 - .1 Maintain as-built record drawings in clean condition.
 - .2 Organize regular Trade Coordination meetings.
 - .3 Organize separate, regular Owner and Consultant Job Meetings in accordance with Section 012200.
 - .4 Maintain a copy of up to date records on site including, but not limited to Permit Sets, Contract Documents updated with all addenda, all Changes and Supplementary Instructions issued by Consultants.
 - .3 Monthly with Each Progress Payment Application
 - .1 Supply Monthly Progress Reports and Construction Schedule in accordance with Section 012200.
 - .2 Adjust Allowances, as required.
 - .3 Current WSIB Form
 - .4 Confirm that payments are being made to subcontractors and suppliers by submission of original copies of the current versions of Statutory Declarations with the second and subsequent Progress Payment Application. Include both Statutory Declarations Form CCDC-9A for the General Contractor and CCDC-9B from subcontractors with each monthly Progress Payment Application. No payment will be made for unincorporated material on the site, unless Bill of Sale in proper format is provided.
 - .4 Prior to Substantial Completion
 - .1 Provide detailed Completion Schedule a minimum of 90 days prior to Substantial Completion. Schedule to illustrate all trades and sequences required for completion and legal occupancy. Issue to Consultants and upon acceptance, to all trades.
 - .2 Coordinate Completion Schedule with Building Commissioner at least 60 days prior to substantial completion or as directed by Consultant.
 - .3 Prior and as a requirement of owner acceptance of Substantial Completion of the work the following to be observed, executed and submitted:
 - .1 DEFICIENCIES ARE LISTED: prior to Substantial Completion, the contractor shall prepare a room by room deficiency list in electronic format on an MS Excel spreadsheet provided by the Consultant. Contractor shall print and review on site with consultants at a site meeting and post on each room or area. This list will be acted upon by all trades and coordinated and updated weekly as a minimum by the General Contractor to ensure all deficiencies are addressed by the date required for Total Performance. Confirm in writing

- to the Architect when and on what dates each deficiency has been completed in a satisfactory manner. The Consultant's site review will be final approval.
- .2 Acceptable preliminary submissions of all Mechanical and Electrical Operations and Maintenance Manuals have been reviewed by Consultants.
 - .3 Acceptable preliminary submissions of all Warranty and Shop Drawing Records have been reviewed by Consultants.
 - .4 All final clean-up to have been executed, as specified in Section 01 74 11.
 - .5 Complete preliminary balancing and provide preliminary Balancing Reports.
 - .4 Failure to comply with these requirements shall have amounts withheld on Progress Payments and delay issuance of Certificate of Substantial Completion.
 - .5 Note that Prior to the Release of Holdback, a similar Progress Claim is required, and must include current Statutory Declaration Forms CCDC-9A for the General Contractor and CCDC-9B from subcontractors updated to refer to the Previous Certificate of Payment.
- .5 Upon Completion (Refer also to 01 78 00 Close-Out Submittals)
- .1 Upon completion of work before the Final Certificate of Payment is issued, the following to be observed, executed and submitted:
 - .2 DEFICIENCIES ARE COMPLETE. Confirm in writing to the Architect when and on what dates each deficiency has been completed in a satisfactory manner. The Consultant's site review will be final approval.
 - .3 Finishing Hardware, Inspection and Verification. Note requirements for qualified installation and inspection in Section 08 71 10- Door Hardware. Inspection only is paid for from Cash Allowances.
 - .4 Organize a Final Inspection tour at which to be present: the Owner's authorized representative; the Architectural, Structural, Mechanical and Electrical Consultants, and their supervisory personnel, if any; the Contractor and his superintendent.
 - .5 Where the above procedure is impossible or where any deficiencies remain outstanding, the Owner's representative and the Consultant concerned, to inspect and accept the affected work and/or material upon notification by the Contractor, that all deficiencies involving this Consultant have been made good.
 - .6 A complete release of all liens arising out of this Contract, other than their own. If a subcontractor or supplier refuses to furnish a release of such a lien, furnish a bond satisfactory to the Owner to indemnify him against any claim under such a lien.
 - .7 Certificates of good standing from the WSIB, for the General Contractor and all Subcontractors.
 - .8 All reference records, as specified, under Section 01 78 00.
 - .9 Certificate of Inspection from Mechanical and Electrical Engineers.
 - .10 Copies of all Lists of Deficiencies with each Deficiency verified when complete by only this project's job Superintendent. The Final List of Deficiencies to be signed, completed by all concerned, if accepted.
 - .11 Statement of Completion from General Contractor.
 - .12 Final adjustment of all Allowances.
 - .13 Certificates required by Provincial, Municipal and other authorities having jurisdiction. Including signed Building Permit.

- .14 Final Balancing Reports showing completed adjustments
- .15 Digital copy of Site Services, Architectural, Structural, Mechanical and Electrical and 2 sets As-Built Drawings.
- .16 As-Built Survey by O.L.S. (2 copies and diskette) – paid from Cash Allowance. Survey to include detailed spot elevations and include elevations at tops of all CB's & MH's, all invert elevations (engage private locate firm as required), elevations at bottoms of curbs, elevations at all corners of building.
- .17 Final copies of all Maintenance Manuals in both digital format and hardcopy.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 PROJECT MEETINGS FOR COORDINATION

- .1 In consultation with the Consultant not later than the second week of construction, arrange for site meetings weekly or every 2 weeks as appropriate to the stage of construction, for project coordination. Such meetings shall fall at the same time each week the meeting is scheduled.
- .2 Responsible representatives of the Contractor's and Subcontractor's office and field forces and suppliers shall be obliged to attend.
- .3 Inform the Owner, Consultant, and those others whose attendance is obligatory, of the date of each meeting, in sufficient time to ensure their attendance.
- .4 Provide physical space for meetings, prepare an agenda, chair and record the minutes of each meeting. Relevant information must be made available to all concerned, in order that problems to be discussed may be expeditiously resolved. Identify "action by: _____".
- .5 Within three days after each meeting, distribute two copies of the minutes to each invited person and regular distribution list to be issued by the consultant.

1.2 PRECONSTRUCTION MEETING

- .1 Within 5 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Include in the agenda the following:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Site Safety and Security
 - .3 Scheduling of Work. Schedule to include a detailed breakdown of mechanical and electrical works.
 - .4 Interference with ongoing business.
 - .5 Work by other Contractors.
 - .6 Schedule of submission of shop drawings and samples.
 - .7 Requirements for temporary facilities, site sign, offices, storage sheds utilities.
 - .8 Delivery schedule of specified equipment and identification of long-lead or other critical items.
 - .9 Site security.
 - .10 Procedures for Contemplated change notices, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .11 Record drawings.
 - .12 Maintenance manuals.
 - .13 Take-over procedures, acceptance, warranties.
 - .14 Monthly progress claims, administrative procedures, photographs, holdbacks.

- .15 Appointments of inspection and testing agencies or firms.
- .16 Insurances, transcript of policies.
- .17 Schedule for progress meetings.

1.3 PROJECT MEETINGS FOR PROGRESS OF WORK

- .1 Conduct progress meetings in accordance with the schedule and/or decisions made at Preconstruction meeting.
- .2 Inform the Owner, Consultant, project consultants, Subcontractors and suppliers and those whose attendance is obligatory, of the date of the meeting, in sufficient time to ensure their attendance.
- .3 Include in the agenda the following:
 - .1 Site Safety and security record or incidents.
 - .2 Review, approval of minutes of previous meeting.
 - .3 Review of Work progress since previous meeting.
 - .4 Field observations, problems, conflicts.
 - .5 Problems which impede construction schedule.
 - .6 Review of off-site fabrication delivery schedules.
 - .7 Corrective measures and procedures to regain projected schedule.
 - .8 Revisions to construction schedule.
 - .9 Progress during succeeding work period as a “two-week look ahead”.
 - .10 Review submittal schedules: expedite as required.
 - .11 Maintenance of quality standards.
 - .12 Pending changes and substitutions.
 - .13 Review proposed changes for effect on construction schedule and on completion date.
 - .14 Other business.

1.4 PROGRESS RECORDS

- .1 Maintain a permanent written record on the site of the progress of the work using standard OGCA form. This record shall be available to the Consultant at the site, and a copy shall be furnished to same on request. The record shall contain:
 - .1 Daily weather conditions, including maximum and minimum temperatures.
 - .2 Dates of the commencement and completion of stage or portion of the work of each trade in each area of the project.
 - .3 Conditions encountered during excavation.
 - .4 Dates of erection and removal of formwork, in each area of the project.
 - .5 Dates of pouring the concrete in each area of the project, with quantity and Particulars of the concrete.
 - .6 Work force on project daily per trade and active hours.
 - .7 Visits to site by personnel of Consultant, Jurisdictional Authorities and testing companies.

1.5 PROGRESS REPORTS

- .1 Submit to the Consultant, Monthly Progress Reports consisting of a concise narrative and a marked-up summary schedule showing physical percentage complete by item and in total. These progress calculations must agree with the Progress Payment Claims. masonry; mechanical, finishing trades and the like. Include with this submission the digital schedule referenced below

1.6 DIGITAL PROJECT SCHEDULES

- .1 At the outset of the project, General Contractor to provide and maintain a digital project schedule including Milestone Dates and listing all trades.
- .2 Update and issue to Consultant in hard copy and electronic copy not less than monthly and at each Progress Draw. To be issued in format compatible with Microsoft Project program.
- .3 At 70% completion, or 16 weeks prior to Substantial Completion, whichever comes first, Project develop a detailed Completion Schedule outlining final coordination and sequences to completion.

1.7 DOCUMENTS REQUIRED AT PROJECT START, DURING CONSTRUCTION AND CLOSE OUT

- .1 Refer to Section 01 11 00 – Summary of Work, article 1.44.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Shop drawings and product data.
- .2 Samples and mock ups.

1.2 SHOP DRAWINGS

- .1 Submit to Architect, for review, shop drawings, product data and samples specified.
- .2 Until submission is reviewed, work involving relevant product must not proceed.

1.3 RELATED SECTIONS

- .1 Section 13 05 41 - Seismic Restraint for Non-structural Components.

1.4 REFERENCES

- .1 Contract documents.

1.5 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Drawings to be originals prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate appropriate portion of work; showing fabrication, layout, setting or erection details as specified in appropriate Sections.
- .3 Identify details by reference to sheet and detail numbers shown on Contract Drawings.
- .4 Maximum sheet size 606 x 909 mm.
- .5 Reproductions for submissions: opaque diazo prints.

1.6 PROJECT DATA

- .1 Certain specification Sections specify that manufacturer's standard schematic drawings, catalogue sheets, diagrams schedules, performance charts, illustrations and other standard descriptive data will be accepted in lieu of shop drawings.
- .2 Above will only be accepted if they conform to following:
 - .1 Delete information which is not applicable to project.
 - .2 Supplement standard information to provide additional information applicable to project.
 - .3 Show dimensions and clearances required.
 - .4 Show performance characteristics and capacities.

- .5 Show wiring diagrams (when requested) and controls.

1.7 COORDINATION OF SUBMISSIONS

- .1 Review shop drawings, product data and samples prior to submission.
- .2 Verify:
 - .1 Field measurements.
 - .2 Field construction criteria.
 - .3 Catalogue numbers and similar data.
- .3 Co-ordinate each submission with requirement of work and Contract documents.
Individual shop drawings will not be reviewed until all related drawings are available.
- .4 Contractor's responsibility for errors and omissions in submission is not relieved by Architect's review of submittals.
- .5 Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Architect's review of submission, unless Architect gives written acceptance of specified deviations.
- .6 Notify Architect, in writing at time of submission, of deviations from requirements of Contract documents.
- .7 After Architect's review, distribute copies.

1.8 SUBMISSION REQUIREMENTS

- .1 Schedule submissions at least fourteen (14) days before dates that reviewed submissions will be required to be returned.
- .2 Submit digital PDF files of shop drawings and product data to Architect for review.
- .3 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Number of each shop drawing, product data and sample submitted.
 - .5 Other pertinent data.
- .4 Submissions must include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name of:
 - .1 Contractor.
 - .2 Subcontractor.
 - .3 Supplier.

- .4 Manufacturer.
- .5 Separate detailer when pertinent.
- .5 Identification of product or material:
 - .1 Relation to adjacent structure or materials.
 - .2 Field dimensions, clearly identified as such.
 - .3 Specification Section number.
 - .4 Applicable standards, such as CSA or CGSB numbers.
 - .5 Contractor's stamp, initialed or signed, certifying review of submission, verification of field measurements and compliance with Contract documents

1.9 INTERFERENCE DRAWINGS

- .1 Prepare interference drawings for all work in confined space: all typical ceiling space conditions and atypical conditions. Coordinate with all trades.
- .2 Submit as shop drawings in advance of fabrication or installation of components. Site conditions requiring corrections, due to failure to provide interference drawings as required will be corrected at no additional cost to the owner.
- .3 Ceiling heights and bulkheads will not be revised during construction due to failure to prepare interference drawings.

1.10 SHORING DESIGN DRAWINGS

- .1 If required as part of this project, or due to construction sequence, it is the contractor's responsibility to provide in advance of any work requiring shoring, detailed Shoring design drawings bearing the seal of a Professional engineer registered in the Province of Ontario and also a Method Statement describing the work sequence.
- .2 Submit to the Consultants as shop drawings in advance of the work.

1.11 SHOP DRAWINGS BEARING THE SEAL OF A PROFESSIONAL ENGINEERS

- .1 In addition to any the similar requirements for shop drawings of any mechanical or electrical systems, Shop Drawings for all structural components or components required to perform in conjunction with other structural or building envelope components, cladding and the like shall bear the seal of a professional engineer licensed in the Province of Ontario.
- .2 In addition, all components to be attached to or suspended from the walls and ceiling areas shall also bear the seal of a professional engineer licensed in the Province of Ontario. This shall include but not be limited to the following:
 - .1 Stage drapery and rigging
 - .2 Stage lighting system
 - .3 Gymnasium equipment such as basketball backstops
 - .4 Projection screen supports
 - .5 Exterior building signage
 - .6 Exterior pylon sign

1.12 LIST OF SAMPLE OR MOCK-UP SUBMITALS

- .1 At the outset of the project the contractor shall prepare a comprehensive list of all shop drawings, sample submissions and mock ups required.
- .2 For assistance only, the following samples and mock up items to be provided are included but not limited to the list following (note this is not exclusive of data sheets and shop drawings):
 - .1 04 21 13 Concrete and Brick Masonry samples, mock-up (2m x 2m)
 - .2 04 21 13 Masonry Accessories samples
 - .3 04 22 00 Concrete Masonry samples
 - .4 06 40 00 Architectural Woodwork samples (300mm x 300mm)
 - .5 06 47 00 Plastic Laminates samples
 - .6 07 11 13 Bituminous Waterproofing mock-up (3m x 2m)
 - .7 07 18 00 Traffic Coatings samples
 - .8 07 21 13 Board Insulation samples
 - .9 07 27 10 Air Barriers samples
 - .10 07 41 43 Aluminum Composite Panels samples, mock-up (3m x 2m)
 - .11 07 81 00 Applied Fireproofing samples (300mm x 300mm)
 - .12 07 84 00 Firestopping samples (300mm x 300mm)
 - .13 07 92 10 Joint Sealing samples and mock up
 - .14 08 44 13 Glazed Aluminum Curtain Walls samples, mock-up
 - .15 08 71 10 Finish Hardware samples
 - .16 08 80 50 Glazing samples (300 x 300)
 - .17 09 30 13 Ceramic Tiling samples
 - .18 09 51 13 Acoustical Panel Ceilings samples (300 x 300)
 - .19 09 65 19 Resilient Tile Flooring samples
 - .20 09 68 00 Carpeting samples (225 x 225)
 - .21 09 84 10 Acoustic Wall Treatment samples (300 x 300)
 - .22 09 91 22 Painting draw downs, mock-up
 - .23 10 11 25 Manufacturer Specialties samples
 - .24 10 14 10 Exterior Building Panel Signage samples
 - .25 10 21 20 Laminated Plastic Toilet Partitions samples
 - .26 10 22 27 Folding Panel Partitions samples
 - .27 31 23 10 Excavating, Trenching and Backfilling samples
 - .28 32 12 17 Asphalt Paving samples
 - .29 32 13 10 Unit Paving on Sand Bed samples
 - .30 32 31 13 Chain Link Fences and Gates samples
 - .31 32 91 21 Imported Topsoil test reports and samples

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Health and safety considerations required to ensure due diligence towards health and safety on construction sites, and meets the requirements laid out Occupational Health and Safety Act - Construction.

1.2 RELATED SECTIONS

- .1 These specifications apply to all divisions of this project specification. It is the responsibility of the Contractor to apply these provisions wherever practical within specification limits to all products and services used on this project.
- .2 Recognized that currently specified materials and methods may conflict with the basic intention of this section. Where reasonable alternate materials and methods exist that are not specified here, and that do not compromise quality or create additional cost for the Owner, notify the Consultant of such alternate materials or methods. Do not proceed to use alternate materials or methods to those specified without the express approval of the Consultant.
- .3 Elsewhere, apply the provisions of this section to all work. Exceptions can only be made when signed off by the Consultant. Suitability of all products used is the responsibility of the Contractor.

1.3 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Safety Data Sheets (SDS).
- .3 Province of Ontario
 - .1 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O.

1.4 COMPLIANCE SPECIFICATION

- .1 The Contractor must comply with all applicable health, safety and environmental regulations.

1.5 BEYOND COMPLIANCE SPECIFICATION

- .1 These specifications apply in addition to all applicable health, safety and environmental compliance regulations. They are incorporated here to reflect the Owner's intention to develop a specification which maximizes environmentally "friendly" materials and methods wherever possible within current technical and budget limitations.

- .2 Beyond compliance specifications recognize that performance well beyond the minimum regulatory standard is often desirable, possible and affordable, often with no cost or low cost options. It also recognizes that application methods or protocols may be as important as the material specified. Therefore these specifications cover both material and methods.
- .3 The primary goal of beyond compliance specification is to reduce the use of products or methods which have negative health and environmental impacts both during and after construction. These considerations may include full life cycle impacts, associated with raw materials, manufacturing, transport, deconstruction and their eventual fate.
- .4 These specifications will specifically address primary categories of readily identifiable products, ingredients and methods.
- .5 These provisions apply to both indoor and outdoor applications equally.

1.6 EXCEPTIONS

- .1 These specifications recognize that not all substitutes are equal and therefore exceptions can be made based on substantive evidence of necessary and superior performance. Special considerations may be given to restricted substances when secondary provisions are made such as sealed in place (contained) applications. All such exceptions must be approved in writing by the Consultant.

1.7 PRODUCTS OR SUBSTANCES TO BE AVOIDED OR LIMITED IN USE

- .1 No product containing the following substances may be used on this project when an equivalent product without or with a lower concentration of this substance is suitable and available. All products containing substances which are known to cause health effects including but not limited to cancer, mutagenic, neurological, or behavioral effects should be avoided if suitable substitutes not containing or containing lower concentrations are available. This provision shall be limited to information contained on Safety Data Sheets, therefore SDS sheets must be reviewed for all products for which such sheets are required. Applications for exceptions must be accompanied by related SDS and product application and performance sheets, clearly showing a need for the exception.

1.8 VOLATILE ORGANIC COMPOUNDS

- .1 No product containing volatile organic compounds (in over simplified terms volatile petro chemical or similar plant derived solvents) may be used on this project when a suitable non VOC or failing that a low VOC substitute is available. Manufacturers may refer to the U.S. EPA definition of VOC's for guidance or alternatively use the low molecular weight organic compound descriptor.
 - .1 Example: Paints, Coatings, Primer, Adhesives, Chalks, Firestops, etc.
- .2 Waterborne equivalents are available for most of the solvent borne products used in construction and in most cases would be the preferred alternative. Waterborne products may in some instances have high VOC contents; therefore the fact that a product is waterborne does not automatically make it acceptable.

1.9 CHLORINATED SUBSTANCES

- .1 Poly Vinyl Chloride (vinyl) and other chlorinated products should be avoided if suitable substitutes are available.

1.10 PLASTICIZERS

- .1 Plasticizers which off-gas (low molecular weight) should be avoided.

1.11 MAN MADE MINERAL FIBRES

- .1 Products containing mineral fibres which can be emitted or abraded should be avoided.
 - .1 Examples: duct liner, mineral fibre ceiling tiles, etc.

1.12 RADIATION

- .1 Products or methods which result in the lowest emission of Electro Magnetic Fields are preferred.

1.13 BIOCIDES

- .1 Products containing biocides (pesticides, miticides, mildewicides, fungicides, rodenticides, etc.) are not to be used if suitable alternatives are available. Highly stable, low human toxicity biocides such as Portcept may be acceptable substitutes. Biocide formulas which break down, emit powders or off-gas should be avoided.

1.14 HEAVY METALS

- .1 Heavy metals such as lead, cadmium, mercury etc. should be avoided.

1.15 ALUMINUM

- .1 Raw aluminum should be avoided, anodized or factory painted aluminum is acceptable. This is particularly applicable to surfaces which people can touch.

1.16 OZONE DEPLETING SUBSTANCES

- .1 Products which contain or which use Ozone Depleting Substances such as Bromide, Chlorofluorocarbons (CFC) or Hydrofluorocarbons (HFC) etc. should be avoided if suitable substitutes are available.

1.17 GREENHOUSE GASES

- .1 Products which contain, use or generate Greenhouse gases such as CO₂ should be avoided if suitable substitutes are available.

1.18 BITUMINOUS (Tar) PRODUCTS

- .1 Products containing tar compounds should not be used if suitable substitutes are available.

1.19 CHEMICAL COMPOUNDS

- .1 Products containing the following chemical compounds should not be used if suitable substitutes are available: Neoprene, Latex, Butyl, ABS, and Formaldehyde.

1.20 ADHESIVES

- .1 Adhesives containing solvents or other non preferred ingredients should be avoided if suitable substitutes are available, including systems designs which do not need adhesives or can use mechanical etc. fastening alternatives

1.21 COMPOSITE PRODUCTS

- .1 Some composite products contain adhesives such as formaldehyde which are not preferred, and some composites such as Fibre Reinforced Plastics are not practical for recycling. These products should be avoided if suitable substitutes are available.

1.22 CLEANERS AND SOLVENTS

- .1 Products, equipment, and methods which require the use of cleaners and solvents are not preferred if suitable substitutes are available. Examples of preferred products would include No Wax floors, or primerless caulks and adhesives, or products not requiring caulks and adhesives.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 FIRES

- .1 Fires and burning of rubbish on site not permitted.

1.2 DISPOSAL OF WASTES

- .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.3 DRAINAGE

- .1 Refer also to Section 31 23 10.
- .2 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .3 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties where indicated.
- .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Restrict tree removal to areas indicated or designated by Engineer.

1.5 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under previous contract and to be provided new under this contract and as requested by local Municipal and Regional Authorities.
- .2 Install, maintain, restore, replace sediment control fence as required by Municipal and Regional authorities. The fence shall be in accordance with Municipal standards.

3. Install, maintain, restore, replace roadside catchbasin sediment protection at all street catch basin in accordance with Municipal standards.
- .3 Install, maintain, restore, replace catchbasin sediment barrier immediately after installation of catch basins on the property in accordance with Municipal Standards.
- .4 A temporary mud mat is required to be installed and maintained per the Erosion & Sediment Control Plan.
- .5 Control emissions from equipment and plant to local authorities emission requirements.
- .6 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .7 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Inspection and testing, administrative and enforcement requirements.
- .2 Tests and mix designs.
- .3 Mock-ups.
- .4 Mill tests.
- .5 Equipment and system adjust and balance.

1.2 PRECEDENCE

- .1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.3 RELATED SECTIONS

- .1 Section 1 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.
- .3 Section 01 11 00, article 1.12 – Quality Control

1.4 REFERENCES

- .1 Contract documents.

1.5 INSPECTION

- .1 General: Materials and workmanship shall be subject to inspection at any time. Cooperate in permitting access for inspection to all places where work is being done or stock is being stored.
- .2 Owner's quality control inspection and testing is specified in the technical sections and will be paid from Cash Allowance except as otherwise specified. Contractor to be responsible to pay for inspections and retesting to verify acceptability of work requiring correction.
- .3 Allow Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .4 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.
- .5 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

- .6 Consultant may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

1.6 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.7 PROCEDURES

- .1 Notify appropriate agency Consultant in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.8 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.

1.9 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as may be requested.
- .2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Consultant and may be authorized as recoverable.
- .3 Allow sufficient time for testing, evaluation, alterations and retesting so as not to interrupt the Progress Schedule for the Project.
- .4 The Consultant may require testing of connections and special prefabricated inserts, as part of the work of this Section.

1.10 MOCK-UPS

- .1 Refer to partial list of mock ups in Section 01 33 00 - Submittal Procedures

- .2 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.
- .3 Construct in all locations acceptable to Consultant.
- .4 Prepare mock-ups for Consultant's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.
- .5 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .6 If requested, Consultant will assist in preparing a schedule fixing dates for preparation.
- .7 Remove mock-up at conclusion of Work or when acceptable to Consultant.
- .8 Mock-ups may remain as part of Work only if previously agreed to by consultant and accepted as acceptable quality upon completion..
- .9 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.11 MILL TESTS

- .1 Submit mill test certificates as required of specification Sections.

1.12 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

1.13 SEALANTS

- .1 Refer also to Section 07 92 10.
- .2 Sealants used for the various building envelope assemblies shall be selected from those specified in the respective assembly Section, and shall be coordinated with the sealant being provided under other building envelope Sections. Preferably, one sealant by the same manufacturer shall be used throughout. If different sealants are selected, from those specified, it is the responsibility of the respective Section to ensure compatibility between selected sealant, substrates, and sealants of other Sections which come in contact with the selected sealant.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Temporary utilities.

1.2 RELATED SECTIONS

- .1 Section 01 52 00 - Construction Facilities.
- .2 Section 01 56 00 – Temporary Barriers and Enclosures.

1.3 INSTALLATION AND REMOVAL

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.4 DEWATERING

- .1 Refer also to Sections 31 23 10 and 01 35 43.
- .2 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.5 WATER SUPPLY

- .1 Water service is available from the existing building. A separate dedicated connection must be used. No interruptions to the existing building service are allowable while the building is occupied.

1.6 TEMPORARY HEATING AND VENTILATION

- .1 Pay for cost of temporary heat and ventilation used during construction, including costs of installation, fuel, operation, maintenance and removal of equipment. Use of direct-fired heaters discharging waste products into work areas will not be permitted unless prior approvals given by the Architect.
- .2 Furnish and install temporary heat and ventilation in enclosed areas, as required to:
 - .1 Facilitate progress of work.
 - .2 Protect work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity for storage, installation, curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .3 Maintain minimum temperature of 10 degrees C or higher where specified as soon as finishing work is commenced and maintained until acceptance of structure by Engineer.

- .4 Ventilating:
 - .1 Prevent hazardous accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful elements.
- .5 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct -fired combustion units to outside.
- .6 The Architect may permit the use of permanent system providing agreement can be reached on:
 - .1 Conditions of use, special equipment, protection and maintenance.
 - .2 Guarantees will not be affected.
 - .3 Approval of the Owner.
- 7. Refer to Section 011100, item 1.30. 'Periodic Cleaning' for replacement of filters at time of final acceptance of work.

1.7 TEMPORARY COMMUNICATION FACILITIES

- .1 For duration of contract until final permanent lines are installed, provide and pay for temporary telephone and fax hook up, lines and equipment necessary for own use and use of Consultant.
- .2 Immediately upon award of contract, arrange for temporary Bell telephone line to be connected to the site trailer for purposes of providing functional communication equipment listed above.

1.8 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

1.9 POWER

- .1 Temporary power is available in the vicinity of the project site.
- .2 Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.
- .3 Install temporary facilities for power such as pole lines and underground cables to approval of local power supply authority.
- .4 Electrical power and lighting systems installed under this Contract may be used for construction requirements with prior approval of Architect, provided that guarantees are not affected. Make good damage. Replace lamps which have been used over period of three (3) months.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Construction aids.
- .2 Office and sheds.
- .3 Parking.
- .4 Project identification – refer to AD Drawings for jobsite sign.

1.2 RELATED SECTIONS

- .1 Section 01 51 00 - Temporary Utilities.
- .2 Section 01 56 00 - Temporary Barriers and Enclosures.

1.3 REFERENCES

- .1 Contract documents.
- .2 Canadian General Standards Board (CGSB)
- .3 Canadian Standards Association (CSA International)

1.4 INSTALLATION AND REMOVAL

- .1 Provide construction facilities in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.5 SCAFFOLDING

- .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.
- .2 As required by Ministry or Labour, design of scaffolding or hoarding shall be by a Professional Engineer.

1.6 ACCESS

- .1 Provide and maintain adequate access to project site.
- .2 The General Contractor for this Work shall, at all times allow the Consultants, the Board, or any other Board commissioned contractor or their employees, access into the building or around the premises, undisturbed, whether union or non-union, as may be required in the execution of other portions of the building work and installation of equipment, etc.
- .3 The General Contractor shall cooperate fully with any and all Board commissioned Contractors.

1.7 HOISTING

- .1 Provide, operate and maintain hoists & cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Hoists & cranes shall be operated by qualified operator.

1.8 ELEVATORS

- .1 Permanent elevators may not be used by construction personnel for transporting of materials unless coordinated with the Architect or Structural Engineer.
- .2 Provide protective coverings for finish surfaces of cars and entrances.

1.9 SITE STORAGE/LOADING

- .1 Provide adequate weather tight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.

1.10 CONSTRUCTION PARKING

- .1 Provide, on site, sufficient temporary parking.

1.11 OFFICES

- .1 Provide office heated to 22 degrees Celsius, lighted 750 Lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing lay down table, telephone, and facsimile machine. Pay telephone not acceptable.
- .2 Maintain in clean condition.
- .3 Provide and maintain in clean condition: two separate plans layout tables, minimum 1200 x 1800 mm each. One table shall be used by the General Contractor and subcontractors at their discretion. The second shall be provided for use by subcontractors and by the consultant or Inspection and Testing Companies during site visits or project meetings.

1.12 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.13 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take such precautions, as required, by local health authorities. Keep area and premises in sanitary condition.

- .3 When permanent water and drain connections are completed, provide temporary water closets and urinals complete with temporary enclosures, inside building. Permanent facilities may be used on approval or Architect.

1.14 JOBSITE SIGN

- .1 Supply and erect a sign (W.P. Plywood Signboard) as shown on AD214 & AD215 Detail Sheets in Binder C.
- .2 Construct plumb and level in neat wood framework and securely anchored in ground by posts to withstand wind pressure of 160 km/h.
- .3 Provide shop drawing of layout.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Barriers.
- .2 Traffic Controls.
- .3 Fire Routes.

1.2 RELATED SECTIONS

- .1 Section 01 51 00 - Temporary Utilities.
- .2 Section 01 52 00 - Construction Facilities.
- .3 Section 01 11 00 - Summary of Work.

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.189M- [84], Primer, Alkyd, Wood, Exterior.
 - .2 CGSB 1.59- [97], Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-O121- [M1978], Douglas Fir Plywood.

1.4 INSTALLATION AND REMOVAL

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.5 SITE ENCLOSURES

- .1 Refer to Section 01 11 00 - Summary of Work, article 1.6 ‘Construction Fencing’. Contractor must provide construction fencing around area of work. Maintain fences in good repair.
- 2. Maintain siltation control fencing as part of site enclosure, as indicated in Section 01 35 43, and/or required Municipal or Regional authorities. Maintain/restore/replace siltation control fencing as directed throughout the construction period to ensure proper function.

1.6 WEATHER ENCLOSURES

- .1 Provide temporary weathertight enclosures protection for exterior openings until permanently enclosed.
- .2 Erect enclosures to allow access for installation of materials and working inside enclosure.

- .3 Design enclosures to withstand wind pressure.
- .4 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.

1.7 DUST TIGHT SCREENS

- .1 Provide dust tight screens or insulated partitions as required to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such work is complete.

1.8 ACCESS TO SITE

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.9 PUBLIC TRAFFIC FLOW

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.10 FIRE ROUTES

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.12 PROTECTION OF BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Consultant locations and installation schedule 5 days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

1.13 TEMPORARY FENCING TO SODDED AREAS

- .1 If the sodded play areas are not be completed a minimum of 6 weeks prior to school occupancy, the contractor shall be responsible for the erection and maintenance of a temporary, leased, perimeter “Mod-U-Lock” fence around the sodded areas for a minimum of 6 months from sod being laid, at no additional cost to the owner. Refer also to Section 01 56 00.

- .2 Leased Modular (Mod U Lok) 1800 high chain link fencing to be supplied and maintained after sod installation in the spring and until the consultant has deemed the sod roots have “knit” and is ready for student play activities, at no additional cost to the owner. Stake with iron “T’s” at minimum 2400 o.c. and maintain to date stipulated as part of this contract and sod is deemed established.
- .3 Remove fencing at end of required period.
- .4 Cost of this temporary fencing for this period to be included Tender Price if sod is not installed within 6 weeks prior to school occupancy, or until the consultant has deemed the sod roots have “knit” and is ready for student play activities.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

3.1 NOT USED

- .1 Not Used

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Requirements and limitations for cutting and patching the Work.
- .2 The responsibilities of this section includes but is not limited to the following item(s), including all related labour and materials necessary to successfully complete the installation of same as detailed on the Drawings.
- .3 The cutting, removal and disposal and patching of masonry wall sections in locations of all new electrical panels and for all mechanical ducts passing through masonry walls or walls of any other construction not automatically accommodated in new work by the mason.
- .4 The cutting, removal and patching of all penetrations required for mechanical and electrical services through floors, ceilings and walls.
- .5 The supply and installation of a Portland cement based leveling skim coat as required to provide an acceptable surface for the installation of new VCT tile to any rooms as described on drawings to receive such flooring.
- .6 Refer to Designated Substance Survey and Abatement documents provided by the School Board.
- .7 All other work not listed in other Sections, but detailed on the Drawings.

1.2 RELATED SECTIONS

- .1 Section 01 11 00 - Summary of Work.
- .2 Section 02 80 00 – Designated Substance Survey
- .3 Section 04 21 13- Brick Masonry
- .4 Section 01 33 00 - Submittal Procedures.
- .5 Section 08 11 14- Metal Doors and Frames
- .6 Section 08 71 15 – Finish Hardware
- .7 Section 09 91 22- Painting
- .8 Section 09 21 16- Gypsum Board Assemblies
- .9 Section 09 51 13- Acoustic Panel Ceilings
- .10 Section 10 11 25- Manufactured Specialties
- .11 Mechanical and Electrical Sections.

- .12 Individual product Sections: cutting and patching incidental to work of section. Advance notification to other sections required.

1.3 SUBMITTALS

- .1 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of any element of Project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of any operational element.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Owner or separate contractor.
- .2 Include in request:
 - .1 Identification of Project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.4 MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Concrete lintel block, reinforcing steel and concrete fill for openings if required at new penetrations in walls or steel lintels as may be permitted by consultant.
- .4 Portland Cement based Concrete Patching Compound compatible with new slab, precast concrete slabs or other flooring to make good a smooth, suitable surface to accept the direct application of new VCT or resilient sheet flooring.
- .5 Portland Cement based Concrete for new floor openings or floor leveling, or patching of floor openings.
- .6 All other materials not listed in other Sections, but detailed on the Drawings.

1.5 EXECUTION

- .1 The Trades requiring cuts, holes or sleeves for their work shall locate them.
- .2 Do not cut, drill or sleeve load-bearing members without obtaining prior written approval from the Consultant for each condition.

- .3 Cut holes carefully, leaving holes no longer than required, with clean, true and smooth edges.
- .4 Fit items to the tolerances established by industry 'Best Practice' standard for applicable type of work.
- .5 Make patches undetectable in the finished work. All other work not listed in other Sections, but detailed on the Drawings, is to be done in a professional manner and to the industry 'Best Practice' standard for the described work.
- .6 Execute cutting, fitting, and patching including excavation and fill if required, to complete Work.
- .7 Fit several parts together, to integrate with other Work.
- .8 Uncover Work to install ill-timed Work.
- .9 Remove and replace defective and non-conforming Work.
- .10 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .11 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .12 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .13 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .14 Restore work with new products in accordance with requirements of Contract Documents.
- .15 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .16 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material, full thickness of the construction element.
- .17 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.
- .18 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

General

.1 SECTION INCLUDES

- .1 Progressive cleaning.
- .2 Final cleaning.

.2 RELATED SECTION

- .1 Section 01 77 00 - Closeout Procedures.
- .2 Section 01 11 00 – Summary of Work.

.3 GENERAL CLEANINESS DURING CONSTRUCTION

- .1 Refer also to Section 01 11 10, item 1.30 ‘Periodic Cleaning’ and coordinate with this Section.
- .2 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- .3 Store volatile wastes in covered metal containers, and remove from premises daily.
- .4 Prevent accumulation of wastes which create hazardous conditions.
- .5 Provide adequate ventilation during use of volatile or noxious substances.
- .6 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .7 Provide on-site dump containers for collection of waste materials, and rubbish.
- .8 Remove waste materials, and rubbish from site.
- .9 Vacuum clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until building is ready for substantial completion or occupancy.
- .10 Schedule cleaning operations so that resulting dust and other contaminants will not fall on wet, newly painted surfaces.

.4 FINAL CLEANING

- .1 At completion of Work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all surfaces exposed to view; leave project clean and ready for occupancy.
- .2 Employ experienced, professional cleaners, for final cleaning.

- .3 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from all sight-exposed interior and exterior finished surfaces; polish resilient and ceramic surfaces so designated to shine finish. Vacuum carpet.
- .4 Clean and polish glass and mirrors.
- .5 Repair, patch and touch-up marred surfaces to specified finish, to match adjacent surfaces.
- .6 Broom-clean paved surfaces; rake clean other surfaces of grounds.
- .7 Clean exposed ductwork, and structure.
- .8 Replace filters.
- .9 Clean bulbs and lamps and replace those burned out.
- .10 Clean diffusers and grilles.
- .11 Clean sinks, faucets, and water closets and controls.
- .12 Remove snow and ice from access to building, if applicable.
- .13 Maintain cleaning until project, or portion thereof, is occupied by Owner.
- .14 All tiled (VCT) floors to be broom swept, wet mopped AND waxed/ polished by the Contractor. The Owner will provide materials (seal/ wax). Contractor to allow for application of three (3) coats of Owner-supplied sealer/waxes.

Products

- .1 **NOT USED**
 - .1 Not Used.

Execution

- .1 **NOT USED**
 - .1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Section 01 11 00 - Summary of Work, article 1.44.
- .2 Contract documents.

1.2 INSPECTION AND DECLARATION

- .1 Refer to Section 01 11 00 – Summary of Work, article 1.44 for a detailed list of requirements.
- .2 Contractor's Inspection: Contractor and Subcontractors: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
- .3 Consultant's Inspection: Consultant and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.
- .4 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
 - .4 Certificates required by Fire Commissioner and Utility companies have been submitted.
 - .5 Operation of systems has been demonstrated to Owner's personnel.
 - .6 Work is complete and ready for final inspection.
- .5 Final Inspection: when items noted above are completed, request final inspection of Work by Owner, Consultant and Contractor If Work is deemed incomplete by Owner and Consultant, complete outstanding items and request re-inspection.
- .6 Declaration of Substantial Performance: when Owner and Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance.
- .7 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

- .8 Final Payment: when Owner and Consultant consider final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. If Work is deemed incomplete by Owner and Consultant, complete outstanding items and request re-inspection.
- .9 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with the CCDC Contract.

1.3 CLEANING

- .1 In accordance with Section 01 74 11 – Cleaning.
- .2 Remove waste and surplus materials, rubbish and construction facilities from the site immediately following completion of work and prior to final inspection.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 As-built, samples, and specifications.
- .2 Equipment and systems.
- .3 Product data, materials and finishes, and related information.
- .4 Operation and maintenance data.
- .5 Spare parts, special tools and maintenance materials.
- .6 Warranties and bonds.
- .7 Final site survey.

1.2 RELATED SECTIONS

- .1 Section 01 45 00 - Quality Control.
- .2 Section 01 77 00 - Closeout Procedures.
- .3 Section 01 78 10 - Guarantee/Warranty Form
- .4 Section 01 91 00 - Commissioning.
- .5 Mechanical Division: Commissioning
- .6 Section 01 11 00 Summary of Work, article 1.43.

1.3 SUBMISSION

- .1 Submit digital PDF file of completed project operation and maintenance volumes and as-built drawings in final form 15 days prior to substantial performance. For equipment put into use with Owner's permission during construction, submit Operating and Maintenance Manuals within 10 days after start-up. For items of Work delayed materially beyond date of Substantial Performance, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.
- .2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .3 Copy will be returned after inspection with Consultant's comments.
- .4 Revise content of documents as required prior to final submittal.
- .5 Submit digital PDF files of revised volumes of data in final form within 10 days after final inspection.

- .6 For contract drawings (architectural, site services, landscaping, structural, mechanical, and electrical), transfer neatly as-built notations onto second and third set and submit all three sets. Cost of only the transfer of these as-built sets into digital format is paid from Cash Allowance. Completion of digital as-built to the Consultant is a mandatory requirement of Total Completion of the Contract.
- .7 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
- .8 If requested, furnish evidence as to type, source and quality of products provided.
- .9 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .10 Pay costs of transportation.

1.4 FORMAT

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf [219 x 279] mm with spine and face pockets.
- .3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.5 CONTENTS - EACH VOLUME

- .1 Table of Contents: provide title of project;
 - .1 date of submission; names,
 - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties;
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

- .3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

1.6 AS-BUILTS AND SAMPLES

- .1 In addition to requirements in Sections 00 21 13 Instructions to Bidders, 01 11 00 Summary of Work and the contract terms, maintain at the site for Owner one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to the Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Consultant.

1.7 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of black line opaque drawings, and a copy of Project Manual, provided by Consultant.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.

- .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
- .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
- .4 Field changes of dimension and detail.
- .5 Changes made by change orders.
- .6 Details not on original Contract Drawings.
- .7 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records, required by individual specifications sections.

1.8 DIGITAL AS-BUILT DRAWINGS

- .1 Retain the services of a CAD drafting company acceptable to the Consultant.
- .2 Transfer to digital file all information recorded on As-Built drawings. Layering of information as per Consultant's instructions.
- .3 The Consultant will provide CAD file of contract documents.
- .4 The cost for preparing digital As-Built drawings shall be included in the contract.

1.9 EQUIPMENT AND SYSTEMS

- .1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.

- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Mechanical Sections.
- .15 Additional requirements: As specified in individual specification sections.

1.10 MATERIALS AND FINISHES

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional Requirements: as specified in individual specifications sections.

1.11 MAINTENANCE MATERIALS

- .1 On completion of project, submit to Architect digital PDF files of Operations Data and Maintenance Manual in English, made up as follows:
 - .1 Bind data in vinyl hard covered, 3 ring loose leaf binder for 215 x 280 mm size paper.
 - .2 Enclose title sheet, labeled "Operation Data and Maintenance Manual", project name, date and list of contents.
 - .3 Organize contents into applicable sections of work to parallel project's specification break-down. Mark each section by labeled tabs protected with celluloid covers fastened to hard paper dividing sheets.
- .2 Include following information, plus data specified.
 - .1 Maintenance instruction for finished surface and materials.
 - .2 Copy of hardware and paint schedules.

- .3 Description, operation and maintenance instructions for equipment and systems, including complete list of equipment and parts list. Indicate nameplate information such as make, size, capacity, serial number.
- .4 Names, addresses and phone numbers of sub-contractors and suppliers.
- .5 Guarantees, Warranties and bonds showing:
 - .1 Name and address of project.
 - .2 Guarantee commencement date (date of Final Certificate of Completion).
 - .3 Duration of guarantee.
 - .4 Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.
 - .5 Signature and seal of Contractor.
 - .6 Additional material used in project listed under various Sections showing name of manufacturer and source of supply.
- .3 Neatly type lists and notes. Use clear drawings, diagrams or manufacturers' literature.
- .4 Include one complete set of final shop drawings (bound separately) indicating corrections and changes made during fabrication and installation.

1.12 STORAGE, HANDLING AND PROTECTION

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.13 WARRANTIES AND BONDS

- .1 Refer to Section 00 21 13 'Instructions to Bidders' for bonding requirements for this project, both at the time of tender submission and throughout the duration of the construction period.
- .2 Refer to Contract Documents for Warranty requirements and conditions for the standard warranty which is required for the work of this contract.
- .3 Extended warranties are required to be issued by manufacturers, fabricators, suppliers and/or installers, sometimes jointly, due to their unique position in the construction process and their ability to guarantee a particular section of work. Refer to individual requirements of extended warranties requested as well as Section 01 11 00 article 1.33.
- .4 Unless specifically noted otherwise, all extended warranties shall commence on the date of Substantial Performance of the Work as certified by the Consultant.
- .5 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

- .6 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal. Use Guarantee/Warranty Form as provided in Section 017810 Sample Guarantee/Warranty Form, whenever standard preprinted trade or manufacturer's Guarantee/Warranty forms are not available. Provide written form for each warranty specified in Section 01 11 00 Summary of Work, Article 1.33.
- .7 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work.
- .8 Date at beginning of time of warranty start shall be Date of Substantial Performance.
- .9 Verify that documents are in proper form, contain full information, and are notarized.
- .10 Co-execute submittals when required.
- .11 Retain warranties and bonds until time specified for submittal.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1. GENERAL

1. To be made out on the letterhead of Guarantor or Warrantor which usually is a Subcontractor.
2. This format is to be used only when standard preprinted trade or manufacturer's forms are not available. Preprinted forms are to include all elements of information shown on this sample or as a minimum.
3. Comply with Requirements for Guarantee/Warranty as specified in Section 01 78 10, Closeout Submittals.

To: Hamilton-Wentworth District School Board

Date: _____

SECTION _____

TITLE _____

GUARANTEE/WARRANTY TO:

OWNER The Hamilton-Wentworth District School Board

PROJECT Mount Hope Elementary School – Renovation & Addition
9149 Airport Road, Mount Hope, ON L0R 1W0

ARCHITECT Hossack Architecture

REFERENCE (to specifications or drawings)

TIME Period of Guarantee/Warranty: _____ years

GUARANTEE/
WARRANTY Starting Date: Substantial Performance as certified by Consultant

Date: _____

(Description of Guarantee/Warranty)

Upon written notification from the Owner or the Consultant that the above work is defective any repair or replacement work required shall be to the Consultant's satisfaction at no cost to the Owner.

This guarantee shall not apply to defects caused by the work of others, maltreatment of materials, negligence or Acts of God.

SUBCONTRACTOR

Signature

Date

Authorized Signing
Officer:

(Name Printed)

Title

Name of Firm:

Address:

Telephone Number

CONTRACTOR

Signature

Date

Authorized Signing
Officer:

(Name Printed)

Title

Name of Firm:

SEAL

Address:

Telephone Number

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This Section outlines the mandatory minimum Health and Safety protocols for all renovation, addition and new school board construction Projects where all or a portion of the existing school building remains occupied and in use.
- .2 These Health and Safety protocols are mandatory minimum requirements, procedures and standards that the School Board insists are fully complied with by all parties involved with renovation projects.

1.2 RELATED SECTIONS

- .1 These specifications apply to all Divisions of this Project specification. It is the responsibility of the Contractor to apply these provisions wherever practical within specification limits to all products and services used on this Project.
- .2 The requirements of this Section supersede those of all other specification Sections and Drawings. Where conflicts exist in procedures, methods or materials, they shall immediately be brought to the attention of the Consultant and Board Project Manager. Where clarification is not immediately available, the Contractor shall assume the specifications contained in this Section are a minimum standard and the more stringent specification shall apply.
- .3 The Contractor must receive approval from Board Project Manager for any deviations from this specification Section.
- .4 The General Contractor shall recognize that it is *he* who is the Constructor of the Project. The General Contractor shall also recognize that he is solely responsible for site safety at the Place of the Work and compliance with the requirements of this Section does not limit or remove his total responsibility for site safety as Constructor of the Project.

1.3 REFERENCES

- .1 Applicable related regulations, standards and laws related to safety include but are not limited to:
 - .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
 - .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Safety Data Sheets (SDS).
 - .3 Province of Ontario
 1. Occupational Health and Safety Act and Regulations for Construction Projects.

1.4 COMPLIANCE SPECIFICATION

- .1 Notwithstanding the requirements of this Section, the Contractor must comply with all applicable health, safety and environmental regulations and statutes.

1.5 BEYOND COMPLIANCE SPECIFICATION

- .1 These specifications apply in addition to all applicable health, safety and environmental compliance regulations. They are incorporated here to reflect the Board's intention to develop a specification which provides the safest practical procedures and policies for construction project sites that are occupied and in use by staff, students and visitors during the execution of the Construction Contract.
- .2 Beyond compliance specifications recognize that performance well beyond the minimum regulatory standard is often desirable, possible and affordable, often with no cost or low cost options. It also recognizes that application methods or protocols may be as important as the material specified. Therefore, these specifications cover both material and methods.
- .3 These provisions apply to both indoor and outdoor applications equally.

Part 2 Products

2.1 NOT USED

Part 3 Execution and Compliance Requirements

3.1 APPLICATION OF COMPLIANCE REQUIREMENTS

- .1 The articles set out herein are to be applied together as a set of related policies and procedures to achieve a comprehensive Health and Safety working protocol.
- .2 The Contractor shall execute all of the procedures and meet all of the requirements set out herein and apply these protocols from the outset of the Construction Phase.
- .3 These procedures or requirements are to be maintained for the duration of the Construction Phase. The Contractor shall not discontinue any of the individual procedures or requirements without the prior approval of the Board Project Manager.

3.2 SITE SUPERVISOR (SITE SUPERINTENDENT)

- .1 A full-time Site Supervisor (Site Superintendent) is required on site, regardless of the number of active workers on site.
- .2 Site Superintendent shall have as a minimum:
 - .1 Successful completion of a multi-session Supervisor's training course conducted by a recognised Construction Association in Ontario.

- .3 Site Superintendent must carry a cell phone at all times during construction with the ability to be reached directly during all work hours and the ability to have voicemail recorded and accessed during all non-work hours including weekends and holidays.
- .4 Site Superintendent must have means of live phone or walkie-talkie communication with the site Flagman during all work hours.
- .5 Site Superintendent shall not be changed throughout project unless confirmed and approved by the Board Project Manager.

3.3 ONTARIO OCCUPATIONAL HEALTH & SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS

- .1 General Contractor to comply with the Ontario Occupational Health & Safety Act and Regulations for Construction Projects, latest edition– including all amendments.
- .2 Beyond compliance in item .1 above, regardless of the number of labourers active on the Project, the General Contractor shall form a contractors’ Health & Safety Committee at the outset of construction. This Committee shall then follow the standard requirements for such a Committee as set out in the *Occupational Health & Safety Act and Regulations for Construction Projects*.

3.4 ON-SITE COMMUNICATIONS

- .1 At the outset of the project the General Contractor shall provide to the Board Project Manager all relevant contact information for the Site Superintendent, GC Project Manager and key sub-contractors including names and cell phone numbers.
- .2 The General Contractor shall provide at least one “emergency contact” telephone number at which the Contractor’s representative can be reached directly during all work hours and have the ability to have voicemail recorded during all non-work hours including weekends and holidays. As outlined below, this may be designated to the Site Superintendent’s cell phone number.
- .3 The Contractor is to ensure that the Board Project Manager is immediately apprised of any safety issues as each arises and the related request and/or resolution. The Board Project Manager is responsible for any decisions that have an effect on the contract execution.
- .4 Notwithstanding the reporting to the Project Manager noted above the Site Superintendent shall liaise with school principal or designate on all safety related matters as required on a daily basis.
- .5 In the event of a safety issue requiring contractual clarification or action (i.e. Change Notice, etc.), the contractor shall ensure that, where applicable, the action is followed up with appropriate documentation.

3.5 FULL-TIME ON-SITE FLAGMEN

- .1 A full-time, designated Flagman is required at all vehicular construction entrances. Refer to drawings for the scope and locations.
- .2 In the event there is more than one entrance to the hoarded/fenced construction area, there must be a separate Flagman for each entrance.
- .3 Flagman may not be same person as Site Superintendent or other construction worker.
- .4 Flagman shall not be changed throughout the Project unless confirmed and approved by the Board Project Manager.
- .5 Flagman must have means of phone communication with Site Superintendent (phone or walkie-talkie).
- .6 The Flagman shall not be designated for any other duties than to act as a Flagman for safety purposes as described herein.
- .7 The Flagman shall meet and escort any construction traffic from the site **entrance** into and out of the hoarded/fenced construction area (including through open site areas until entrances to hoarding).
- .8 The Flagman shall only open hoarded areas when construction traffic moves through and immediately re-close gates.
- .9 The Flagman shall control construction parking at the school site (including vehicles parking or traveling in unauthorized areas).
- .10 The location of the Flagman shall be set to ensure the safe guarding of staff, student, and pedestrian traffic.
- .11 If not designated on the Contract Documents, the location of the Flagman shall be confirmed with the Board Project Manager and Consultant at the outset of the project and before the placement of hoarding and fencing.
- .12 Where the Contractor deems it necessary, in order for the Flagman to carry out the required full-time duties, the cost of a temporary shelter shall be included in the Tender Price.
- .13 The Flagman shall be properly attired to carry out his duties, including the use of safety equipment (e.g. wear reflective vest, have appropriate traffic hand-held “Stop” sign and have a visible identification tag).

3.6 SITE SAFETY SIGNAGE

- .1 Standardised Safety Signage is required at all construction entrances.
- .2 If not designated on the Contract Documents, the location of the Safety Signage shall be confirmed with the Board Project Manager and Consultant at the outset of the Project and before the placement of hoarding and fencing.

- .3 Safety Signage is to be posted at all street entrances to school site and at each entrance to hoarded/fenced construction area.
- .4 Total surface area of signage is to avoid exceeding municipal standards that would require a separate signage permit.
- .5 Access signage text shall include cell phone contact number for Site Superintendent.
- .6 Signage posted at gates shall state restrictions on hours of entry and egress as described in the Contract Documents and under no circumstances shall construction traffic be allowed within 30 minutes prior to school start, during recess, lunch break, and 30 minutes after dismissal periods.

3.7 ACCESS/EGRESS CONTROLS

- .1 At the outset of the Contract, the General Contractor shall advise all suppliers and subcontractors of the protocols listed herein and of the requirement to contact the Site Superintendent by Cell phone prior to entering the site.
- .2 The drivers of all construction vehicles entering the site, including delivery vehicle drivers, are to contact site Superintendent by cell phone prior to entering site; the Site Superintendent shall, in turn, give notice to the Flagman to be aware of the traffic and authorize the Flagman to allow entry of that vehicle.
- .3 Vehicular Gates are only for entry and exit of for construction purposes such as construction personnel, Authorities performing inspections, Board representative, delivery personnel, and disposal pickup and ONLY under escort by the Flagman. As such vehicular gates must remain closed and locked at all times and only opened for access/egress under escort by the Flagman, then closed and locked again.
- .4 Gates are to be lockable swing gates for vehicles and man gates at all access points to the hoarded/fenced construction area.

3.8 CONTRACTOR PARKING

- .1 Contractor parking shall be restricted to hoarded areas or designated parking areas only where pre-approved by Board Project Manager and Principal.
- .2 Contractor parking is restricted from all off-site street areas that interfere with site specific parent drop-off and parking areas.

3.9 REQUIRED PRE-CONSTRUCTION MEETINGS

- .1 Meeting 1: Contractor shall receive approval from the Architect and the Board Project Manager for parking, vehicular movement, access/egress strategies at a Pre-construction meeting taking place in advance of mobilizing on site.

- .2 Meeting 2: Once hoarding and fencing is erected BEFORE site construction is fully active and vehicles or equipment is mobilized on site, an initial site meeting shall take place at which time the layout of trailers and staging, deliveries, storage of materials, parking areas and vehicular movement to be reviewed and approved by the Board Project Manager.
- .3 See article 3.12- 'Site Meetings' following.

3.10 CONSTRUCTION FENCING AND HOARDING

- .1 Construction hoarding requirements shall be a site based decision to be determined by the Architect and the Board Project Manager at the design stage and shown on Contract Documents.
- .2 No fencing or hoarding shall be less than a continuous 1800 mm high. Some areas against school play areas are to be 2400mm high, as noted on drawings.
- .3 In portions of the site where chain link is approved, it shall be continuous 1800 mm high chain link fencing, wire-tied to staked iron 'tees' at 1800 mm on centre - OR - leased, modular 'quick fencing' if staked down and wire tied together.
- .4 All fenced and hoarded areas to be gated with lockable vehicular and man gates-minimum construction to be steel rail and chain link construction.
- .5 Plastic snow fencing is NOT permitted.
- .6 All hoarding and fencing shall be maintained in a stable condition, for duration of construction period as part of the base contract price and to include Superintendent's inspection at the beginning and end of each work day.
- .7 All Fire Routes to be outside all fenced and hoarded areas and maintained clear at all times.
- .8 'Covered way' protection shall be provided when accesses or pathways are in proximity to construction, in accordance with Ministry of Labour *Occupational Health & Safety Act* Regulations.

3.11 OCCUPATIONAL HEALTH AND SAFETY DEPARTMENT REPRESENTATIVE

- .1 A representative of the Occupational Health and Safety department may visit site at any anytime throughout the duration of the Contract to review the site, as it relates to the safety of the occupied areas of the site. Such site review shall neither constitute an inspection or approval for the Contractor.
- .2 Concerns or issues identified by the representative shall be communicated through the Board Project Manager and the school Principal for corrective action.

3.12 SITE MEETINGS

- .1 Coordinate the requirements of this Section with *Section 01 22 00 – 'Meetings and Progress Reports'*.

- .2 Initial site meeting to take place after erecting fencing and hoarding but prior to the mobilisation of any vehicles, equipment or start of Work.
- .3 Contractor shall ensure that the Board Project Manager, School Principal and a representative of the Board's Health, Wellness & Safety Department and the School Principal attend the initial site meeting.
- .4 The initial meeting shall review and approve a standardised agenda for all site meetings and a thorough review of the Site Safety Protocol.
- .5 The standardised agenda shall include a Checklist and Report of Health and Safety items at the beginning of the agenda. This Checklist shall be included and each item reviewed at all site meetings for the duration of the project.
- .6 The Checklist of Site Safety items shall include but not be limited to:
 - .1 Contractor's report of site safety record and report of recent site activities, precautions or actions.
 - .2 Review any visits to the site and actions required by Ministry of Labour or Board Health, Wellness & Safety representatives or other Authorities Having Jurisdiction.
 - .3 Contractor's Health & Safety policy manual posted in site trailer.
 - .4 Copy of Ministry of Labour *Occupational Health & Safety Act and Regulations for Construction Projects* in site trailer.
 - .5 Name of General Contractor H&S representative.
 - .6 Continuing compliance with Safety Signage.
 - .7 Hoarding & fencing layout and condition.
 - .8 Access and egress measures and any breaches of requirements.
 - .9 Confirmation of communications link between Site Superintendent & Flagman.
 - .10 Work that may produce any noxious odours and the containment measures, (*i.e.*: schedule, type, approvals required therefore).
 - .11 Copies of Safety Data sheets in site trailer.
 - .12 Complete meeting minutes including details of Safety Checklist shall be copied to Architect, Board Project Manager and Principal.
- .7 Contractor to produce record of written Memorandum to all subtrades and suppliers detailing but not limited to: hours of delivery; site access procedures and restrictions; use of existing facilities.
- .8 Contractor to prepare detailed and accurate written record of all meetings to be kept and issued to all parties.

3.13 CONTRACTOR'S HEALTH AND SAFETY COMMITTEE MEETINGS

- .1 As required in item 3.1.2, the Contractor shall form a Health and Safety Committee, hold meetings and record minutes of meetings for the duration of the Contract.

- .2 Contractor to maintain a copy of Health & Safety Committee minutes on site for review by Ministry of Labour or Board representative(s).

END OF SECTION

Part 1 General

1.1 QUALITY ASSURANCE

- .1 This Section includes parameters for the general design and performance for the work of Sections which comprise the building envelope including but not limited to, masonry cavity walls, metal cladding, soffits, windows, entrances and roofing.
- .2 Performance of the building envelope shall be guaranteed by the Contractor.

1.2 DESIGN

- .1 General: Design and engineer as required, fabricate, erect, and/or install building envelope in compliance with the Ontario Building Code, other regulations and requirements of authorities having jurisdiction.
- .2 Take into account construction tolerance limitations, creepage, deflection and other movements of the structure.
- .3 Accommodate, by means of expansion and contraction provisions, any movement in the building envelope assemblies themselves and between the assemblies and the building structure. Allow for expansion and contraction of components caused by ambient temperature range, surface temperature variation of components, wind, seismic forces, structural deflection and racking; without causing misalignment of joints, breakage of joints and air/vapour barriers, water and air penetration through the assembly, glass breakage, or other defects detrimental to appearance or performance.
- .4 Method of attachment to the structure shall take into account site peculiarities so that site and air vibrations or normal temperature movements of the building do not loosen, weaken and/or fracture the connection between building envelope assembly components and the structure or between the components themselves.
- .5 Reinforce building envelope assembly components, as required, so that the members can safely sustain design loads.
- .6 Assemble and secure assemblies in manner which will keep stresses on sealants within the sealant manufacturer's recommended maximum performance levels.
- .7 Rain Screen Principle: Except where detailed otherwise, construct building envelope assemblies based on the "Rain Screen" principle as advocated by the National Research Council of Canada. All voids between the assembly components as well as those between components and the structure shall have:
 - .1 Gaskets, baffles, overlaps, seals and compartmentalization as required providing a barrier "Rain Screen" to effectively prevent excessive rain water entry into any of the building envelope cavities but to allow pressure equalization of cavity air spaces.
 - .2 air barriers and seals are required to prevent entry of interior building air into building envelope cavities, and exterior air into the building. Air barriers and seals shall be able to withstand wind design pressures.

- .3 such provisions in the form of openings between cavities and the building exterior of sufficient cross sections to provide adequate pressure equalization. All openings shall be effectively baffled against direct rain water entry. Air spaces shall be baffled and compartmentalized to prevent chimney effect within the air spaces vertically and horizontally.
- .4 Thermal separators, isolators and seals placed to eliminate contact between interior humid air and a cold surface or structural component to prevent condensation and ice build-up on such surfaces during cold weather.

1.3 WATER, VAPOUR AND MOISTURE

- .1 Comply with the design and performance requirements specified in the building code, and as specified herein, including the following principles:
- .2 Drain to the exterior face of the assembly, any water entering at joints and any condensation occurring within the building envelope assembly.
- .3 Design, fabricate and install the assembly to be watertight to the interior under the interior and exterior design conditions in combination with movements occurring due to loads imposed.
- .4 At design conditions no water penetration to the building interior side of the assembly shall occur.
- .5 The requirements for an air barrier and a vapour barrier are intended to be provided at the same plane in the building envelope design unless otherwise indicated or specified. In such cases, the Drawings and Specifications refer to "air/vapour barrier". The definition of the air/vapour barrier for the purpose of these Specifications is "a continuous membrane including joints of membrane between components and to adjacent construction which prevents or retards penetration of moisture laden air and the diffusion of water vapour through it".
- .6 The maximum water vapour transmission of all components forming the vapour barrier shall be (1.72 ng/Pa x s x sq.m.) (0.3 Imperial Perms) unless specified otherwise.
- .7 At design conditions no condensation shall occur on room side surfaces.
- .8 Sound: Provide completed installations free from vibrations, wind whistles and noise due to thermal and structural movement and wind pressure.
- .9 Seismic: Fabricate and erect cladding assemblies to prevent damage due to earthquake forces as required by The Ontario Building Code.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

These photographs are provided for convenience only.

Bidders remain responsible to inspect the site and assume existing site conditions.

The following photos were taken July 2024.













END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01 11 00 - Summary of Work
2. Section 01 56 00 – Temporary Barriers and Enclosures
3. Section 01 73 03 – Execution Requirements (Cutting and Patching)
4. Section 04 21 13- Brick and Block Masonry
5. Section 01 33 00 - Submittal Procedures
6. Section 08 11 14- Metal Doors and Frames
7. Section 08 71 15 – Finish Hardware
8. Section 09 91 22- Painting
9. Section 09 21 16- Gypsum Board Assemblies
10. Section 09 51 13- Acoustic Panel Ceilings
11. Section 10 11 25- Manufactured Specialties
12. Mechanical and Electrical Sections

1.2 Scope

1. Scope includes but is not limited to:
 - .1 Demolition or alteration of all structural, architectural, mechanical, electrical or site components, equipment, fitments and finishes as required to execute the work.
 - .2 The removal, repair and reinstallation as required to make good of existing acoustic unit ceilings gypsum board bulkheads, windows, doors, hollow metal screens and partition walls where required to be removed for routing new services, general alterations or revising demising walls.
 - .3 Removal and reinstallation as indicated of any existing fixed in place millwork, chalkboards or tackboards or similar fitments or devices identified to remain and be reinstalled.
 - .4 Grinding and patching of walls where chalkboards or fitments have been removed and surface adhesives or similar surface deficiencies remain.
 - .5 Cutting and removal of slabs on grade to remove or replace existing drains, clean outs, oil interceptors, trenches and sub slab services contained within them, not previously removed by Abatement work.
 - .6 Making good of all walls and floors remaining where sections of walls or floors have been removed and surfaces require repair.
 - .7 Making good of all finishes to remain as result of selective demolition.

1.3 Existing Conditions

1. Existing Ground Floor structure contains in-floor heating system materials that are no longer in use but may remain abandoned in place. These may be encountered during construction.
2. Take over structures to be demolished or altered based on their condition on date that tender is accepted, at time of examination prior to tendering.
2. Contractor may confirm the prior removal of all asbestos containing materials in documentation left on site following prior abatement work contract. Should areas of

asbestos be found which are not documented as removed or included in the scope of this work for removal, it shall be reported to the Consultant and Owner's representative for review and instructions for removal.

3. Prior to beginning alteration or demolition, confirm with Owner that no items to be salvaged or turned over to the owner remain in the work areas.

1.4 Protection

- .1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades parts of existing building to remain. Provide bracing, shoring and underpinning required. Make good damage and be liable for injury caused by demolition.
- .2 Take precautions to support structures and, if safety of building being demolished or adjacent structures or services appears to be endangered, cease operations and notify Consultant.
- .3 Refer to structural drawings for Shoring Designs and Method Statements.
- .4 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

Part 2 Products NOT USED

Part 3 Execution

3.1 Work

- .1 Dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction. Confirm in Divisions 15 and 16 for removal and re-use of mechanical and electrical materials and equipment.
- .2 Refer to drawings for furniture, materials or equipment to be removed and turned over to the owner. Carefully remove such items and store in location designated by Owner.
3. For a scope of work refer to all Drawings and also coordinate items to be altered, re-built, cleaned or otherwise "made good" as a result of the cutting and patching scope of work described in Section 01 73 03 Execution Requirements or other Sections.

3.2 Preparation

- .1 Disconnect electrical, telephone/PA and data service lines in work areas without disrupting main service to building and in accordance with regulations of authorities having jurisdiction. Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.
- .2 Disconnect and cap designated mechanical services in accordance with requirements of local authority having jurisdiction.
 - .1 Natural gas supply lines, if applicable to be removed by gas company by qualified tradesman in accordance with gas company instructions.
 - .2 Remove, cap or dispose of other underground services as indicated in drawings.
 - .3 Do not disrupt active or energized utilities traversing premises designated to remain undisturbed.

- .3 Floor scans to locate hidden or buried services in the work area have NOT previously been done. Prior to cutting, demolition or removal of any slabs on grade or areas where services may be concealed, engage a **private locate firm to provide magnetic and X-ray scans** of all areas involved. This is the responsibility of the General Contract and costs for such scans are to be included in the base contract price.

3.3 Disconnection and Removal of Materials and Equipment

- .1 Contractor shall cooperate with the Owner to determine which materials are to be removed and retained by Owner. The Owner will decide which items or equipment they wish to retain as their property and all other materials shall be removed from the premises by this Contractor. The equipment which is to be retained by the Owner shall be stored on site where directed by the Owner.
- .2 Refer to mechanical and electrical drawings and for disconnection and removal and/or relocated existing electrical, ductwork, piping and/or equipment.

3.4 Temporary Removals and Replacement

- .1 All items to be removed and installed shall be completed so that replaced materials are left in a clean undamaged state. If required to be replaced due to damage, the contractor shall include in his price for the component to be replaced and installed at no additional cost to the Contract.

3.5 Oil Tank Investigation and Possible Removal

- .1 A Subsurface Investigation report by MTE Engineers dated Dec. 7, 2018, has been provided in the specifications for sampling taken in the location of a possible oil tank within the work area. No concerns were reported with regards to contaminated soil. Should the tank be encountered during construction, the Contractor is to remove the underground abandoned oil tank and infill the area with compacted subbase and reinforced concrete slab as per proposed drawings. Refer to mechanical drawings. Oil Tank Removal, environmental engineering fees and associated testing is to be expended from the Cash Allowance. Licensed Petroleum Mechanic is required to remove the existing oil tank (with the fill pipe). The oil & gas interceptor is to be removed as part of the base bid (by the General Contractor).

3.6 Selective Demolition

- .1 Follow best trade practices for all demolition and alteration work. This includes but is not limited to the following items.
- .1 The school will be mostly vacant during summer months of the construction, with the exception of some spaces being utilized intermittently. Despite this, ensure demolition work does not disrupt any ongoing aspect of the operation of the building.
- .2 **Confirm all demolition work (including potential noise, vibration, tools or equipment noise, etc.) in advance with the principal of the school on a daily basis. Similarly, notify all building occupants in advance at each possible interruption in services or utilities.**
- .3 If noise is excessive and becoming unbearable for the building occupants, the principal may request certain types of construction to be performed outside of school hours.

- .4 Protect all areas from damage and intrusion by means of locking rooms under construction when not in use, use of dust tight screens and temporary partitions and hoarding. Demolish to minimize dusting. Refer to drawings for locations and other Specification Sections for requirements.
- .5 Signage to be posted at all times. Take precautions to demolish only areas as necessary to complete the work, and avoid damage to adjacent areas. Make good all areas affected by demolition or renovation activities, whether specifically included in the contract documents or not.
- .6 The Contractor shall be responsible for damage to all areas affected by renovation or alteration activities.
- .7 Prior to demolition, the Contractor shall carefully examine the drawings in relation to the site conditions, to ensure that all intended work can be carried out without ambiguity. Incorrect demolition of any work by the Contractor, will be back-charged to him. Any discrepancies between the drawings and the site conditions, must be reported to the Consultants immediately.
- .8 Demolish or remove interior and exterior elements as indicated.
- .9 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
- .10 At end of each day's work, leave work in safe condition so that no part is in danger of toppling or falling. Protect interiors of parts not to be demolished from exterior elements at all times.
- .11 Demolish masonry and concrete walls in small sections. **Salvage existing imperial block units in coordination with Section 04 21 13 to re-use as patching in existing imperial unit masonry.**
- .12 Carefully remove and lower structural framing and other heavy or large objects as required. Where partial walls of exposed concrete block masonry is to remain, grind all exposed edges to a bullnose and patch as required suitable for final painting.
- .13 Do not sell or burn materials on site.
- .14 Remove contaminated or dangerous materials from site and dispose of in safe manner to minimize danger at site or during disposal, in accordance with all governing legislation.
- .15 Where applicable, saw cut existing terrazzo floor and base as required and remove to nearest metal 'panel' joint to enable replacement at a full panel. **Replace with terrazzo flooring to match existing as closely as possible. Provide sample to consultant for approval.**
- .16 Following demolition and removals of floor trenches, walls and fitments, coordinate with Section 01 73 03. As part of the work of this section, scarify or otherwise grind existing or new slabs in preparation for slab in-fills and a self leveler skim slab by Section 01 73 03. That Section is responsible for the provision of a backfill, slab on grade patching and self leveling skim coat where required in advance of new VCT finishes by Section 09 65 19.
- .17 Patch and make good existing wall, ceiling and floor finish with identical original materials if affected by temporary protection or by previous Abatement contract.

3.7 Repair to all Finishes and Colours

- .1 Repaint all walls in rooms or areas modified as indicated in the Finish Schedule, or as directed by the Consultant.

- .2 Repair and make good all fixtures, finishes, trims and surfaces to all floor, wall and ceiling areas in rooms or areas whether or not they have been modified or affected by the work or by previous Abatement Contract.
- .3 Existing paint colours are to be matched exactly using computer colour matching.

END OF SECTION

Part 1 General

- .1 ASBESTOS AUDIT UPDATE Report
- .2 Refer to report pertaining to hazardous materials and abatement survey and findings
 prepared by others bound within Binder C specifications for convenience only.
- .2 This report outlines the hazardous materials discovered at this site.

A HAZARDOUS BUILDING MATERIAL ASSISSMENT (Pre-Construction) of the building was carried out for the Owner by:

Pinchin Ltd.

Pinchin File: **336572.023**
Report is dated **July 2, 2025**

Adam Lazette, B. Eng.
Author, Project Technologist

Jessica Cozzitorto, C.Tech.
Project Manager, Team Leader

Damian Palus, C.E.T.
Reviewer, Operations Manager

- .4 The specification sections related to Asbestos Survey or Abatement forms part of the Contract Documents but contains information that is not prepared by the Architect or their sub consultants. The referenced asbestos reports and asbestos abatement specifications were not prepared by or under the supervision of the Architect. While every effort has been made to attempt to provide comprehensive abatement testing information for the purposes of design and tendering, the Architect claims no responsibility or liability for the accuracy of the information contained in the report.
- .5 Refer also to Division 1 and Section 01 35 30 and coordinate with this Section.

Part 2 Products

- 2.1 1. Refer to documents noted above.

Part 3 Execution

- .1 Inspection and Testing will be paid for under Cash Allowances.

END OF SECTION

PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Related work specified elsewhere:
 - .1 Section 02 82 00.01 Asbestos Abatement – Type 1 Procedures
 - .2 Section 02 82 00.02 Asbestos Abatement – Type 2 Procedures
 - .3 Section 02 83 10 Lead Abatement – Class 1 Procedures
 - .4 Section 02 83 11 Lead Abatement – Class 2 Procedures
- .3 Site Conditions identifies all known hazardous building materials within the Project Area. The information provided is for general reference only. It is recommended each Contractor confirm existing conditions on site prior to tender close.
 - .1 The specification fulfils the requirements of Section 30 of the Ontario Occupational Health and Safety Act.
 - .2 The specification fulfils the requirements of the Section 10 of Ontario Regulation 278/05.
- .4 The Outline of Work identifies the location, condition and quantities of hazardous building materials to be removed as part of this project.
 - .1 It is the intent that work prescribed this Section will result in the removal of all hazardous materials as outlined and the decontamination of all surfaces or materials which may have been or become contaminated by hazardous materials either during or prior to work of this Contract.

1.2 Site Conditions

- .1 Refer to the report entitled “Revised Hazardous Building Materials Assessment (Pre-construction), Additions and Renovations Project, Mount Hope Elementary School, 9149 Airport Road, Mount Hope, Ontario”, dated July 2, 2025, prepared by Pinchin Ltd., file number 336572.023.

1.3 Outline of Work

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

- .2 Refer to the Contract Drawings for the extent of construction work and the Work Areas. Work to be phased.
- .3 Install Hoarding Walls between Abatement Work Areas and Occupied Areas as required.
- .4 Refer to Contract Documents for phasing and schedule.
- .5 Using Type 1 procedures prescribed in the Section identified in Related Work, perform the following work:
 - .1 Remove and dispose of asbestos-containing vinyl floor tiles from the Learning Commons 210 (HMIS Location 8770).
 - .1 Include to remove vinyl floor tiles where present under millwork.
 - .2 Include to remove carpeting covering vinyl floor tiles in the Learning Commons. Dispose of carpet as clean waste.
 - .2 Remove and dispose of mastic where present behind mirrors, chalkboards, and/or tackboards where scheduled to be removed.
 - .1 Remove mastic completely from substrate.
 - .3 Remove and dispose of sinks with asbestos-containing mastic from Room 131 (HMIS Location 8751).
- .6 Using Type 2 procedures (with a full enclosure) prescribed in the Section identified in Related Work, remove and dispose of asbestos-containing vinyl floor tile mastic using power tools/machines equipped with a HEPA filtered dust collection device in Room 210A.
- .7 Using Type 2 procedures (with a full enclosure) prescribed in the Section identified in Related Work, remove and dispose of the following:
 - .1 Bulk heads in Room 131 (HMIS Location 8751) where adjacent to asbestos-containing texture finish.
 - .1 Lag exposed edges of texture coat when done.
 - .2 Block walls with asbestos-containing paint/block filler where openings/penetrations in walls are required and/or where the paint/block filler will be disturbed.
 - .3 Include for full enclosures as required on exterior of building.
- .8 Using Type 2 procedures prescribed in the Section identified in Related Work, perform the following work using power tools/machine equipped with a HEPA filtered dust collection device:
 - .1 Remove all items, including but not limited to; light fixtures, electrical/mechanical items, conduit, junction boxes, supports, etc. attached to asbestos-containing texture finish ceilings and/or block walls with asbestos-containing paint/block filler. Seal exposed edges of asbestos-containing texture coat where damaged, with lagging compound.

- .2 Install/attach items and light new fixture hangers, electrical conduit etc. attached to asbestos-containing texture finish ceilings and/or block walls with asbestos-containing paint/block filler.
- .3 Patch and make good all disturbed asbestos-containing surfaces.
- .9 Follow lead procedures prescribed in the Sections identified in Related Work to remove 10 square feet of flaking/peeling paint on walls within the Resource Room 132A (Location 8749) and 120 SF of peeling flaking/peeling paint from Corridor 118 (Location 8764).
- .10 Follow lead procedures prescribed in the Sections identified in Related Work to complete the following work:
 - .1 Demolish block walls with lead paint.
 - .2 Create openings in walls with lead paint as required per contract drawings.
- .11 Follow lead procedures prescribed in the Sections identified in Related Work when disturbing lead materials, lead paint and/or materials with lead paint.
- .12 Follow mercury procedures for removal and disposal of fluorescent light tubes.
- .13 Follow mould procedures in accordance with the Environmental Abatement Council of Canada's (EACC) Mould Abatement Guidelines when disturbing or working in close proximity to mould impacted materials.
- .14 Refer to Specification Sections identified in the Related Work for specified personnel protective measures for the safe handling, removal, clean-up, enclosure, or repair of hazardous materials in each phase or work area.
- .15 Protect surfaces, building fabrics and items remaining within the Abatement Work Area.
- .16 Without disturbing hazardous materials, perform removals where required, prior to abatement work.
 - .1 Maximize waste diversion by use of resale of building materials, or recycling.
- .17 Isolate the Abatement Work Area from adjoining Occupied and Non-Occupied Areas whether present at an interior or exterior location.
- .18 Maintain emergency and fire exits from Abatement Work Area, or establish alternative exits satisfactory to Provincial Fire Marshall and local authorities having jurisdiction. Maintain extra routes from occupied areas. Place emergency exit signs at locations to clearly mark exit route. Seal emergency exit doors so as not to impede use of door during emergency evacuation.
- .19 Remove, clean, store and replace at completion of work, non-operating mechanical and electrical equipment, ducts, building components, materials or items removed to accommodate asbestos removal.

- .20 Remove and dispose of as appropriate waste, building components, materials and items contaminated by hazardous materials that cannot be effectively cleaned.
- .21 Encapsulate remaining hazardous materials at locations where removal is deemed impractical by the Abatement Consultant.
- .22 Encapsulation will not be permitted where removal of building materials or structures scheduled for demolition will facilitate access to the asbestos materials in question.
- .23 Final clean work area to remove visible signs of asbestos and other hazardous materials, other debris or settled dust.
- .24 Apply lock-down agent to exposed surfaces throughout the work area and to surfaces from which any hazardous materials have been removed.
 - .1 Do not apply lock-down to materials which would be damaged by its application.
- .25 Unless otherwise specified, the handling, removal, clean-up or repair of hazardous materials or surfaces contaminated with hazardous materials is to be performed following wet removal techniques.

1.4 Schedule

- .1 Provide necessary manpower, supervision, equipment and materials to maintain and complete the project on schedule.
- .2 Work Hours:
 - .1 Coordinate all work, scheduling and phasing with the Owner.
 - .2 Duration for which HVAC systems may remain shutdown to accommodate quiet hours work will vary in accordance with outside weather conditions and internal demand. Duration of quiet hours work will have to be scheduled accordingly and in consultation with the Abatement Consultant and Owner.
- .3 Provide 48 hours written notice to the Abatement Consultant of any request to work outside normal working hours. Obtain written approval before proceeding.

1.5 Definitions

- .1 Abatement Consultant: Owner's Representative providing inspection and air monitoring.
- .2 Abatement Contractor: Contractor or sub-contractor performing work of this section.
- .3 Abatement Work Area: Area where work takes place which will, or may, disturb hazardous materials.
- .4 Amended Water: Water with wetting agent added for the purpose of reducing surface tension to allow thorough wetting of materials.

- .5 Asbestos: Any of the fibrous silicates defined in Regulation 278/05 including: actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.
- .6 Asbestos-Containing Material (ACM): Material identified under Site Conditions including any debris, overspray, fallen material and settled dust.
- .7 Authorized Visitors: Building Owner, Abatement Consultant, or designated representative, and persons representing regulatory agencies.
- .8 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with Regulation 278/05 and the Occupational Health and Safety Act, and has knowledge of the potential or actual danger to health and safety in the work.
- .9 Contaminated Waste: Material identified under Site Conditions, including fallen material, settled dust, other debris and materials or equipment deemed to be contaminated by the Abatement Consultant.
- .10 Curtained Doorway: Doorway consisting of two (2) overlapping flaps of rip-proof polyethylene arranged to permit ingress and egress from one room to another while permitting minimal air movement between rooms.
- .11 DOP Test: A testing method used to determine the integrity of the Negative Pressure unit or vacuum using a Dispersed Oil Particulate (DOP) or Poly Alpha Olefin (PAO) HEPA filter leak test. This test is to be conducted on site where units are to be installed. Refer to the Environmental Abatement Council of Canada (EACC) DOP/PAO Testing Guideline 2013 or ANSI/ASME N510-2007.
- .12 Fitting: Individual segments or pieces of a mechanical service line which may include but is not limited to the hangers, tees, elbows, joints, valves, unions, etc.
- .13 Friable Material: Material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.
- .14 HEPA: High Efficiency Particulate Aerosol filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.
- .15 Lead-Containing: The Ontario Ministry of Labour (MOL) has not established a lower limit for concentrations of lead in paint, below which precautions do not need to be considered during construction projects. Pinchin follows the recommendations of the Environmental Abatement Council of Canada (EACC) Lead Guideline for Construction, Renovation, Maintenance or Repair. The Guideline suggests that 0.1% (1,000 ppm) lead in paint represents a de minimis concentration of lead in paint for construction hygiene purposes, that is a concentration below which the lead content is not the limiting hazard in any disturbance of leaded paint for non-aggressive disturbance of painted finishes, (hand powered demolition, chipping, scraping, light sanding, etc.).
- .16 Lead-containing: Paints containing lead at a concentration of 0.009% (90 ppm) or greater.

- .17 Lead Waste: Waste generated from removal of lead-containing materials, or the substrate and paint finish where left intact.
- .18 Mercury Waste: Equipment, materials or items containing mercury or contaminated with mercury.
- .19 Milestone Inspection: Inspection of the Abatement Work Area at a defined point in the abatement operation.
- .20 Negative Pressure: A reduced pressure within the Abatement Work Area (> 0.02 inches of water column) established by extracting air directly from Abatement Work Area and discharging it to exterior of building.
- .21 Non-Friable Material: Material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .22 Occupied Area: Any area of the building or adjoining space outside the Abatement Work Area.
- .23 Personnel: All Contractor's employees, sub-contractors employees, supervisors.
- .24 PCM: Phase Contrast Microscopy.
- .25 Remove: Remove means remove and dispose of (as applicable type of waste) unless followed by other instruction (e.g. remove and turn over to Owner).
- .26 TEM: Transmission Electron Microscopy.

1.6 Regulations and Guidelines

- .1 Comply with Federal, Provincial, and local requirements, provided that in any case of conflict among those requirements or with these Specifications, the more stringent requirements shall apply. Work shall be performed under regulations in effect at the time work is performed.
- .2 Where regulations are not present, follow accepted industry standards and applicable Guideline documents.
- .3 Regulations and Guidelines include but are not limited to the following:
 - .1 Ministry of Labour Occupational Health and Safety Act Regulations for Construction Projects including Revised Statutes of Ontario 1990, Chapter 0.1 and Ontario Regulation 278/05.
 - .2 Ministry of the Environment and Climate Change Regulation for the disposal of waste, including R.R.O. 1990, Reg. 347 as amended.
 - .3 PCB Regulations, SOR 2008-273 and R.R.O. 1990, Reg 362.
 - .4 Regulation 490/09 Designated Substances.

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

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

1.7 Quality Assurance

- .1 Removal and handling of hazardous materials is to be performed by persons trained in the methods, procedures and industry practices for Abatement.
- .2 Ensure work proceeds to schedule, meeting all requirements of this Specification.
- .3 Complete work so that at no time airborne dust, visible debris, or water runoff contaminate areas outside the Abatement Work Area.
- .4 Any contamination of surrounding area (indicated by visual inspection or air monitoring) shall necessitate the clean-up of affected area, and in the same manner applicable to an Abatement Work Area at no cost to the Owner.
- .5 All work involving electrical, mechanical, carpentry, glazing, etc., shall be performed by licensed persons experienced and qualified for the work required.

1.8 Supervision

- .1 Provide on site for each work shift, a Shift Superintendent(s), who has authority regarding all aspects related to manpower, equipment and production.
- .2 At all times during work, the Shift Superintendent(s) must be on site. Failure to comply with this requirement will result in a stoppage of all work, at no cost to the Owner.
- .3 Replace supervisory personnel, with approved replacements, within three (3) working days of a written request from the Owner. Owner reserves the right to request replacement of supervisory personnel without explanation.
- .4 Do not replace supervisory personnel without written approval from the Owner.

1.9 Instruction and Training

- .1 Instruction and training must be provided by a competent person.
- .2 All workers completing Type 1, 2 or 3 asbestos abatement must be trained in compliance with Section 19 of O.Reg. 278/05.
 - .1 For Type 3 asbestos abatement, workers must be trained and certified per Section 20 of O.Reg. 278/05.

1.10 Notification

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

- .2 Inform all trades on site of the presence and location of hazardous materials identified in the Contract documents.
- .3 Notify the Owner or Owner's Representative, the Joint Occupational Health and Safety Committee and the Provincial Ministry of Labour, if suspected asbestos-containing materials not identified in the contract documents are discovered during the course of the work. Stop work in these areas immediately.
- .4 Notify Sanitary Landfill site as per O.Reg. 347/90 as amended.

1.11 Submittals

- .1 Submit prior to starting work:
 - .1 Provincial Workers' Compensation Board Clearance Certificate.
 - .2 Insurance certificates.
 - .3 Copy of Company Health and Safety Policy and applicable programs.
 - .4 Ministry of Labour Notice of Project form.
 - .5 Copy of Certificate of Approval for disposal of hazardous materials waste and location of landfill.
 - .6 Pre-removal damage survey of the Abatement Work Area(s), waste transport routes, and bin storage areas
- .2 Submit the following information regarding personnel prior to starting work:
 - .1 Proof in the form of a certificate that workers have been certified under the Ministry of Training, Colleges and Universities course 253W.
 - .2 Proof in the form of a certificate that supervisory personnel have attended a training course on asbestos removal or are certified as supervisors under the Ministry of Training, Colleges and Universities course 253S.
 - .3 Written statement that personnel have had instruction on hazards of exposure to hazardous materials identified within this scope, the use of respirator, protective clothing, worker and waste decontamination procedures, and all aspects of work procedures and protective measures.
 - .4 WHMIS training certificates for all personnel.
 - .5 Certificate proving that each worker on site has been fit tested for the respirator appropriate for the work being performed.
- .3 Submit the following information regarding HEPA filtered devices prior to construction of enclosure or asbestos abatement:

- .1 Performance data on HEPA filtered vacuums including DOP tests no more than 3 months old.
- .2 Performance data on negative air units including DOP tests which must be no more than 3 months old if the unit is vented outdoors or which must be performed on site immediately prior to initial usage and when HEPA filters are changed if the unit is vented indoors.
- .3 DOP tests to be performed by an independent testing company.
 - .1 DOP testing company is required to submit a detailed technical report of testing protocol, including Introduction, Methodology, Results, Conclusions, and Recommendations, including results of the Air-Aerosol Mixing Uniformity test as per ASME N510-1989 (1995).
 - .2 DOP testing company must also provide calibration certificates from an independent calibration firm or from the manufacturer of the testing equipment for both the aerosol photometer and the pressure gauge on the aerosol generator dated within 1 calendar year from the on-site testing date.
 - .3 DOP testing company must also provide the National Sanitation Foundation (NSF) certification name and number of the on-site technician performing the testing.
- .4 Proof of calibration of DOP testing equipment.
- .4 Submit the following prior to isolating the work area:
 - .1 Safety Data Sheets for chemicals or material used in the course of the Abatement Project.
- .5 Submit the following upon completion of the work.
 - .1 Manifests, waybills, bills of lading etc. as applicable for each type of waste.

1.12 Inspection

- .1 From commencement of work until completion of clean-up operations, the Abatement Consultant is empowered by the Owner to inspect for compliance with the requirements of governing authorities, adherence to specified procedures and materials, and to inspect for final cleanliness and completion.
- .2 The Abatement Consultant is empowered by the Owner to order a shutdown of work when leakage of asbestos from the controlled work area has occurred or is likely to occur.
- .3 Any deviation from the requirements of the Specifications or governing authorities that is not approved in writing may result in a stoppage of work, at no cost to the Owner.
- .4 Additional labour or materials expended by the Contractor to rectify unsatisfactory conditions and to provide performance to the level specified shall be at no additional cost to the Owner.

- .5 Inspection and air monitoring performed as a result of Contractor's failure to perform satisfactorily regarding quality, safety, or schedule, shall be back-charged to the Contractor.
- .6 Facilitate inspection and provide access as necessary. Make good work disturbed by inspection and testing at no cost to the Owner.
- .7 Refer to the Sections identified in Related Work for specified milestone inspections which are to take place at defined points throughout the abatement operation specific to each phase or work area.
- .8 Provide 24 hours written notice to the Abatement Consultant of any request for scheduling of milestone inspections or transportation of waste through Occupied Areas.
- .9 The following Milestone Inspections may take place, at the Owner's cost, as outlined in each related specification section :
 - .1 Milestone Inspection - Clean Site Preparation
 - .1 Inspection of preparations and set-up prior to contaminated work in the Abatement Work Area.
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .1 Inspection during asbestos removal, monitoring removal methods, site deficiencies, performing occupied air monitoring, etc.
 - .3 Milestone Inspection - Visual Clearance
 - .1 Inspection of Abatement Work Area after completion of all abatement, but prior to application of lock-down agents or dismantling of enclosure.
- .10 Refer to the Sections identified in Related Work for specified milestone inspections which are to take place at defined points throughout the abatement operation specific to each phase or work area.
- .11 Do not proceed with next phase of work until written approval of each milestone is received from the Abatement Consultant.

1.13 Air Monitoring - Asbestos

- .1 Air monitoring will be performed using Phase Contrast Microscopy (PCM) following the National Institute for Occupational Safety and Health Method 7400.
- .2 Co-operate in the collection of air samples, including providing workers to wear sample pumps for up to full-shift periods. Contractor will be responsible for the cost of testing equipment repairs or resampling resulting from the actions of the Contractor's forces.
- .3 Results of PCM samples at or exceeding 0.05 fibres per cubic centimeter of air (fibre/cc) or greater, outside an Abatement Work Area, will indicate asbestos contamination of these areas. Respond as follows:

- .1 Suspend work within the adjoining Abatement Work Area until written authorization to resume work has been received from the Abatement Consultant.
 - .2 Isolate and clean area in the same manner applicable to the Abatement Work Area.
 - .3 Maintain work area isolation, and repeat clean-up operations until visual inspection and air monitoring results are at a level equal to that specified.
 - .4 At the discretion of the Abatement Consultant provide additional negative air units at locations specified in response to elevated fibre levels being detected in the Clean Change Room or Occupied Areas.
- .4 Results of PCM samples at or greater than 0.01 fibres per cubic centimeter of air (fibre/cc), collected within the Abatement Work Area enclosure after the site has passed a visual inspection, and an acceptable coat of lock-down agent has been applied, will indicate asbestos contamination of these areas. Respond as follows:
- .1 Maintain work area isolation and re-clean entire work area. Then apply another acceptable coat of lock-down agent to exposed surfaces throughout the work area.
 - .2 Repeat above measures until visually inspected and air monitoring results are at a level equal to that specified.
 - .3 Alternate to items above, the Asbestos Abatement Contractor can pay for analysis of PCM samples by Transmission Electron Microscopy (TEM) at NVLAP accredited laboratory.
 - .1 Enclosure to remain sealed, with negative pressure maintained, and subject to required daily inspections until TEM results are received.
- .5 Additional labour or materials expended by the Contractor to rectify unsatisfactory conditions and to provide performance to the level specified shall be at no additional cost to the Owner.
- .6 Cost of additional inspection and sampling performed as a result of elevated fibre levels in areas outside the Abatement Work Area or from within the work area following completion of work, will be back-charged to the Contractor.

1.14 Worker Protection

- .1 Instruct workers before allowing entry to the Abatement Work Area. Instruction shall include training in use of respirators, dress, showering, entry and exiting from an Abatement Work Area, and all other aspects of work procedures and protective measures.
- .2 Workers shall not eat, drink, chew gum or tobacco, vape or smoke in the Abatement Work Area.
- .3 Workers shall be fully protected at all times when possibility of disturbance of hazardous materials exists.

- .4 Provide soap, towels and facilities for washing of hands and face, which shall be used by all personnel when leaving the Abatement Work Area.
- .5 Respiratory Protection
 - .1 Refer to each particular Section of the Specification for specified type of respiratory equipment specific to each phase or work area.
 - .2 Respirators shall be:
 - .1 Certified by the National Institute of Occupational Safety and Health (NIOSH) or other testing agency acceptable to the Ministry of Labour.
 - .2 Fitted so that there is an effective seal between the respirator and the worker's face. Ensure that no person required to enter an Abatement Work Area has facial hair which affects the seal between respirator and face.
 - .3 Assigned to a worker for their exclusive use.
 - .4 Maintained in accordance with manufacturer's specifications.
 - .5 Cleaned, disinfected and inspected by a competent person after use on each shift, or more often if required.
 - .6 Repaired or have damaged or deteriorated parts replaced.
 - .7 Stored in a clean and sanitary location.
 - .8 Provided with new filters as necessary, according to manufacturer's instructions.
 - .9 Worn by personnel who have been fit checked by qualitative or quantitative fit-testing.
 - .10 Instruction on proper use of respirators must be provided by a competent person as defined by the Occupational Health and Safety Act.
 - .3 Provide protective clothing, to all personnel which:
 - .1 Is made of a material that does not readily retain nor permit penetration of asbestos fibres or lead/silica dust.
 - .2 Consists of head covering and full body covering that fits snugly at the ankles, wrists and neck.
 - .3 Once coveralls are worn, treat and dispose of as contaminated waste.
 - .4 Is replaced or repaired if torn or ripped.
 - .4 Use hard hats, safety footwear and other protective equipment and apparel required by applicable construction safety regulations.

1.15 Visitor Protection

- .1 Provide clean protective clothing and equipment to Authorized Visitors.
- .2 Instruct Authorized Visitors in the use of protective clothing and Abatement Work Area entry and exit procedures.
- .3 Authorized visitors are required to be fit tested on respirators, prior to entering Abatement Work Area.
 - .1 Respirator worn must be compliant with Section 13 and Table 2 of O.Reg. 278/05.

1.16 Signage

- .1 Asbestos Abatement Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:
 - .1 There is an asbestos dust hazard.
 - .2 Access to the work area is restricted to persons wearing protective clothing and equipment.
- .2 Lead Abatement Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:
 - .1 There is a lead dust, fume or mist hazard.
 - .2 Access to the work area is restricted to authorized persons.
 - .3 Respirators must be worn in the work area.
- .3 Vehicles, Bins and Asbestos Waste Containers: Post signs on both sides of every vehicle used for the transportation of asbestos waste and on every asbestos waste container. Signs must display thereon in large, easily legible letters that contrast in colour with the background the word “CAUTION” in letters not less than ten centimetres in height and the words:
 - .1 CONTAINS ASBESTOS FIBRES
 - .2 Avoid Creating Dust and Spillage
 - .3 Asbestos May be Harmful To Your Health
 - .4 Wear Approved Protective Equipment.
- .4 Place placards in accordance with Transportation of Dangerous Goods Act.

1.17 Waste and Material Handling

- .1 Waste bins must be placed on grade or in receiving.
- .2 All bins for hazardous materials must be covered and locked when waste transfer is not being performed.
- .3 Ensure redundant non-ACM, rubble, debris, etc. removed during contaminated work are treated, packaged, transported and disposed of as appropriate waste.
- .4 Clean, wash and apply Post Removal Sealant to metal waste prior to removal from Abatement Work Area. Recycle metals.
- .5 Clean, wash and apply Post Removal Sealant to non-porous materials prior to disposal as clean waste. Obtain prior written approval from the Abatement Consultant for each individual type of material.

- .6 Clean and wash equipment prior to removal from Abatement Work Area if removed prior to completion.
- .7 Place all equipment, tools and unused materials that cannot be cleaned in Abatement Waste Containers.
- .8 As work progresses, and at regular intervals, transport the sealed and labelled waste containers from the Abatement Work Area to waste bin.
- .9 Place items in bins according to waste classification. Place asbestos waste, lead waste, metals, non-asbestos waste, etc. in separate bins.
- .10 Removal of waste containers and decontaminated tools and materials from the Abatement Work Area shall be performed as follows:
 - .1 Remove any visible contamination from the surface of non-porous or cleanable waste being removed from the Abatement Work Area. If the item can be cleaned, remove it from the site as clean waste.
 - .2 Place waste or item in Waste Container and seal closed.
 - .3 Wet wipe outside of Waste Container.
 - .4 Within Decontamination Facility, Transfer Room or at the perimeter of the Abatement Work Area, place in second Waste Container. Seal closed.
 - .5 Remove waste containers and transport to appropriate bin.
- .11 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with Owner. Use a closed, covered cart to transport through Occupied Areas.
- .12 Provide workers transporting waste with means to access full personal protective equipment and all tools required to properly clean up spilled material in the case of a rupture of a Waste Container.
- .13 Pick-up and drop off of garbage bin shall be at pre-approved times, and must not interfere with the Owners operations.
- .14 Transport hazardous waste to landfill or waste transfer station licensed by the provincial Ministry of the Environment.
- .15 Cooperate with the provincial Ministry of the Environment inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to the Owner.

1.18 Re-establishment of Objects and Systems

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

- .2 Re-establish electrical, communication, HVAC and other services previously disconnected or otherwise isolated to accommodate work by this Section.
- .3 Make good at completion of work, all damage not identified in pre-removal survey.

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

- .1 Refer to the Sections identified in Related Work for specified materials, equipment or facilities specific to each phase or work area.
- .2 Materials and equipment must be in good condition and free of debris and fibrous materials. Disposable items must be of new materials only.
- .3 Airless Sprayer: AC powered pressure washer that allows wetting agent to mix with water, uses no air or compressed air, and has a nozzle to regulate power and pressure.
- .4 Amended Water: Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of materials.
- .5 Asbestos Waste Container: A container acceptable to disposal site, Ministry of the Environment, and Ministry of Labour, comprised of the following:
 - .1 Dust tight.
 - .2 Suitable for the type of waste.
 - .3 Impervious to asbestos.
 - .4 Identified as asbestos waste.
- .6 Discharge Ducting: Polyethylene Tubing. Reinforced with wire. Diameter to equal negative pressure machine discharge. Not to be longer than required, or so long that negative pressure is compromised.
- .7 HEPA Filtered Negative Pressure Machine: Portable air handling system which extracts air directly from the Abatement Work Area and discharges the air to the exterior of the building. Equipped as follows:
 - .1 Prefilter and HEPA filter. Air must pass HEPA filter before discharge.
 - .2 Pressure differential gauge to monitor filter loading.
 - .3 Auto shut off and warning system for HEPA filter failure.
 - .4 Separate hold down clamps to retain HEPA filter in place during change of prefilter.
- .8 HEPA Vacuum: Vacuum with necessary fittings, tools and attachments. Discharged air must pass through a HEPA filter.

- .9 Hose: Leak-proof, minimum busting strength of 500 PSI or greater if required, abrasion resistant covering, reinforcing, and machined-brass couplings. Maintained and tested. Hose to be temperature resistant if it is to carry domestic hot water.
- .10 Lead Waste Container: An impermeable container acceptable to disposal site and Ministry of the Environment, that is:
 - .1 Dust tight.
 - .2 Suitable for the type of waste.
 - .3 Evaluated for leachable lead content, and disposed of in accordance with applicable regulations.
 - .1 Where lead waste exceeds 5.0 mg/L of lead in the TCLP analysis, label as lead waste and dispose of as leachate toxic hazardous waste.
 - .2 Where lead waste is below 5.0 mg/L of lead in the TCLP analysis, disposed of as construction waste.
- .11 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints.: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints.
- .12 Post Removal Sealant (or Lockdown): Sealant that when applied to surfaces serves the function of trapping residual asbestos fibres or other dust. Product must have flame spread and smoke development ratings both less than 50. Product shall leave no stain when dry. Post Removal Sealant shall be compatible with replacement insulation or fireproofing where required and capable of withstanding service temperature of substrate. Apply to manufacturer's instructions.
- .13 Protective Clothing: Disposable coveralls complete with head covering and full body covering that fits snugly at the ankles, wrists and neck.
- .14 Rip-Proof Polyethylene Sheeting: 8 mil (0.20 mm) fabric made up from 5 mil (0.13 mm) weave and two (2) layers of 1.5 mil (0.05 mm) poly laminate or approved equal. In sheet size to minimize on-site seams and overlaps.
- .15 Sprayer: Garden type portable manual sprayer or water hose with spray attachment if suitable.
- .16 Tape: Duct tape or tape suitable for sealing polyethylene to surfaces under both dry and wet conditions in the presence of Amended Water.
- .17 Wetting Agent: Non-sudsing surfactant added to water to reduce surface tension and increase wetting ability.

PART 3 EXECUTION

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

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.
- .2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Type 1 or Low Risk procedures, and Pinchin and Owner specific requirements.

1.3 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of ACM exists.
 - .1 Provide non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters when requested by personnel.
 - .2 When requested by personnel, provide protective clothing.
- .2 Provide protective clothing, to all personnel entering the Abatement Work Area.
- .3 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Inspections

- .1 Refer to Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

PART 3 EXECUTION

3.1 Site Preparation

- .1 Remove stored or non-fixed items from the Abatement Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.
- .2 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.
- .3 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .4 Install polyethylene drop sheets below areas of work.
- .5 Install polyethylene sheeting on openings in walls and floors (as required) and seal.

- .6 Install signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.
- .7 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .8 Provide power from ground fault interrupt circuits.
- .9 Shut down HVAC systems serving the Abatement Work Area.
 - .1 Install polyethylene sheeting over openings in ducts and diffusers and seal.
 - .2 HVAC to remaining areas of building must not be disrupted during work of this section.
 - .3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.
 - .4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.
- .10 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc).
- .11 Without disturbing asbestos-containing materials, remove and dispose of non-hazardous materials as clean waste prior to asbestos removal work, where possible.

3.2 Maintenance of Abatement Work Area

- .1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.
- .3 Maintain Abatement Work Area in tidy condition.
- .4 Remove any standing water on polyethylene/floor at the end of every shift.
- .5 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.3 Asbestos Removal - General

- .1 Do not use powered tools or non-hand held tools.
- .2 Do not use compressed air to clean or remove dust or debris.
- .3 Do not break, cut, drill, abrade, grind, sand or vibrate ACM if it cannot be wetted. Type 2 procedures would be required if the material cannot be wetted due to hazard or damage.
- .4 Wet ACM prior to work and keep ACM wet throughout the removal process.
- .5 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .6 Frequently and at regular intervals, place all waste in asbestos waste containers.
- .7 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.4 Asbestos Removal - Vinyl Asbestos Tile

- .1 Wedge a heavy duty scraper in seam of two adjoining tiles and gradually force edge of one tile up and away from floor. Do not break off pieces of tile, but continue to force balance of tile up.
- .2 Place tile, without breaking into smaller pieces, into Asbestos Waste Container.
- .3 Force scraper through tightly adhered areas by striking scraper handle with a hammer.
- .4 Heat tile thoroughly with a hot air gun until heat penetrates through tile and softens adhesive in areas where scraper will not remove tile.
- .5 Deposit scrapings into asbestos waste disposal bag.
- .6 HEPA vacuum floor on completion of work in area.

3.1 Asbestos Removal - Removal of Chalkboard, Tackboard, Mirror mastic

- .1 Wet all material to be disturbed.
- .2 Undo fasteners if necessary to remove material.
- .3 Break material only if unavoidable, and wet material if broken during work.
- .4 Use only non-powered hand-held tools to remove ACM.
- .5 Scrape to remove material adhered to substrate.
- .6 Place removed ACM directly into an asbestos waste container.

3.2 Asbestos Removal - Removal of Other Non-Friable Asbestos Materials - Sinks

- .1 Wet all material to be disturbed.
- .2 Undo fasteners if necessary to remove material.
- .3 Break material only if unavoidable, and wet material if broken during work.
- .4 Use only non-powered hand-held tools to remove ACM.
- .5 Place removed ACM directly into an asbestos waste container.

3.3 Abatement Work Area Dismantling

- .1 Wash or HEPA vacuum equipment and tools used in contaminated Abatement Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Abatement Work Area.
- .2 Place tools and equipment used in contaminated work site but not cleaned in polyethylene bags prior to removal from Abatement Work Area.
- .3 Clean polyethylene sheeting and drop sheets which with HEPA vacuum or wet cleaning methods at completion of work.
- .4 Wet drop sheets and polyethylene sheeting.
- .5 Carefully roll polyethylene sheeting and drop sheets toward the centre. As polyethylene is rolled away, immediately remove visible debris beneath with a HEPA vacuum.
- .6 Remove remaining polyethylene sheeting and tape.
- .7 Place polyethylene sheeting, drop sheets, tape, disposal clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.

3.4 Waste and Material Handling

- .1 Refer to Section 02 81 00.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.
- .2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Type 2 or Moderate Risk procedures, and Pinchin and Owner specific requirements.

1.3 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of ACM exists.
- .2 Provide the following minimum respiratory protection to all personnel:
 - .1 Full face respirators with P100 high efficiency (HEPA) cartridge filters, for:
 - .1 Removal of all or part of a ceiling if asbestos is likely lying on the surface.
 - .2 Use of a HEPA filtered power tool on non-friable ACM if the material is not wetted.
 - .2 Non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.
- .3 Provide protective clothing, to all personnel entering the Abatement Work Area.
- .4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Inspections

- .1 Refer to Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

2.2 Hoarding Walls

- .1 Type A Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, or other suitable methods.
- .2 Type B Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of rip-proof polyethylene sheeting on each side of wall.

- .3 Windows: Install sufficient transparent windows area in hoarding walls to allow observation of entire work area from outside the enclosure where existing solid walls do not make up the perimeter.

2.3 Transfer Room

- .1 Transfer Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size accordingly to accommodate number of workers.
- .2 Install walls as follows:
 - .1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.
 - .2 Install one layer rip-proof polyethylene sheeting on interior walls of Transfer Room.
- .3 Install one layer of rip-proof polyethylene sheeting over one layer of 6 mil polyethylene sheeting beneath entire Transfer Room.
- .4 Install one layer rip-proof polyethylene sheeting over roof.
- .5 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.
- .6 Install a fire extinguisher, mount to wall.

2.4 Curtained Doorways

- .1 Construct as follows:
 - .1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Transfer Room.
 - .2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.
 - .3 Install weights attached to bottom edge of each door flap.
 - .4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Remove stored or non-fixed items from the Abatement Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.
- .2 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.
- .3 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .4 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .5 Provide power from ground fault interrupt circuits.
- .6 Shut down HVAC systems serving the Abatement Work Area.

- .1 Install polyethylene sheeting over openings in ducts and diffusers and seal.
- .2 HVAC to remaining areas of building must not be disrupted during work of this section.
- .3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.
- .4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.
- .7 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc).

3.2 Site Preparation –Enclosure Required

- .1 Install polyethylene enclosure complete with Windows at Abatement Work Areas for the following work:
 - .1 Removal of friable asbestos-containing materials (less than 1 square metre).
 - .2 Removal of a false ceiling (or part of) where asbestos-containing material is presumed or known to be present on the surface.
- .2 Install Transfer Room where duration of work is to last longer than one 8 hour shift.
- .3 Seal openings in floor using tape, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.
 - .1 Install polyethylene sheeting on floors of Abatement Work Area. Cover floors first so that polyethylene on walls is overlapped by at least 305 mm.
- .4 Construct Hoarding Walls between Abatement Work Area perimeter and occupied areas, as required.
- .5 Install polyethylene sheeting at openings in walls (as required) and seal.
- .6 Install 6 mil polyethylene sheeting on walls within the Abatement Work Area., including existing walls that make up, or are within, the Abatement Work Area.
- .7 Provide a completely sealed polyethylene top for free standing enclosures.
- .8 Extend to underside of ceiling system, enclosures for access into ceilings. Enclosure may be supported from the ceiling system if ceiling can support the polyethylene.
- .9 Install Curtained Doorways.
- .10 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged. Items to remain include but are not limited to:
 - .1 Millwork.
 - .2 Doors.
 - .3 Bulkheads.
 - .4 Electrical Equipment.
 - .5 Mechanical Equipment.
- .11 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .12 Establish negative pressure in Abatement Work Areas as follows:
 - .1 Provide sufficient HEPA filtered negative pressure machines to exchange a

- volume of air equivalent to that of the Abatement Work Area a minimum of every 20 minutes.
- .2 Provide additional HEPA filtered negative pressure machines as required to ensure air flow from Occupied Area into Abatement Work Area.
- .3 Arrange negative air units to maximize the distance between units and decontamination facilities.
- .4 Provide weighted flaps in perimeter Hoarding Walls as necessary to provide make-up air.
- .5 Operate HEPA filtered negative pressure machines continuously from first disturbance of ACM until completion of dismantling.
- .6 Replace prefilters to maintain specified flow rate.
- .7 Replace HEPA filter as required to maintain flow rate and integrity of unit.
- .8 Discharge HEPA filtered negative air machines as follows:
 - .1 To building exterior.
 - .1 Remove existing glazing where necessary and replace with a 19 mm plywood panel.
 - .2 Install panel securely in window frame so that it cannot be pushed into the building and make weather-tight with caulking.
 - .3 For each negative pressure unit, provide a 300 mm diameter, screened, duct opening through panel.
 - .4 Direct discharge away from building access points.
 - .5 Reinstall glazing to match existing upon completion of work.
- .13 Place required tools to complete the abatement with the Abatement Work Area.
- .14 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

3.3 Site Preparation – No Enclosure Required

- .1 Install caution tape around work area where existing walls are not present.
- .2 Cover walls, floors, finishes, millwork, equipment and furnishings remaining in the Abatement Work Area with polyethylene sheeting before disturbing ACM to control the spread of dust.
- .3 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged. Items to remain include but are not limited to:
 - .1 Millwork.
 - .2 Doors.
 - .3 Bulkheads.
 - .4 Toilet Partitions.
 - .5 Plumbing fixtures.
 - .6 Electrical Equipment.
 - .7 Mechanical Equipment.
 - .8 Kitchen Equipment.
- .4 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

- .5 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .6 Place HEPA vacuum in Abatement Work Area.
- .7 Place required tools to complete the abatement with the Abatement Work Area.

3.4 Maintenance of Abatement Work Area

- .1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.
- .3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.
- .4 Maintain Abatement Work Area in tidy condition.
- .5 Remove standing water on polyethylene/floor at the end of every shift.
- .6 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.5 Asbestos Removal - General

- .1 Do not use compressed air to clean or remove dust or debris.
- .2 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .3 Frequently and at regular intervals, place all waste in asbestos waste containers.
- .4 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.6 Asbestos Removal – Block Walls with Asbestos-Containing Paint/Block Filler

- .1 Use the procedures described above under *Site Preparation – Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Remove block walls for openings/penetrations required for mechanical equipment and where scheduled for demolition.
- .4 Place removed ACM directly into an asbestos waste container.
- .5 Lag edges of openings/remaining walls with lagging.
- .6 Patch and make good all disturbed asbestos-containing surfaces.

3.7 Asbestos Removal – Bulk Heads Adjacent to Asbestos-Containing Texture Finish On Ceilings

- .1 Use the procedures described above under *Site Preparation – Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Remove bulk heads adjacent to asbestos-containing texture finish.
- .4 Place removed ACM directly into an asbestos waste container.
- .5 Lag edges of openings/remaining walls with lagging.

- .6 Patch and make good all disturbed asbestos-containing surfaces.

3.8 Asbestos Disturbance – Removal/Installation of Items Affixed to Block Walls with Asbestos-Containing Paint/Block Filler and/or Texture Finish with HEPA Filtered Power Tools

- .1 Use the procedures described above under *Site Preparation – No Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Turn on HEPA vacuum. Vacuum to remain operational throughout work.
- .4 Remove/install items to block walls with asbestos-containing paint/block filler.
- .5 Place removed ACM directly into an asbestos waste container.
- .6 If power tool can disconnect from HEPA vacuum, remove tool, and HEPA vacuum tool and bit, blade, etc, and shrouds.
- .7 Remove items and turn over to owner and/or protect where not scheduled for removal.
- .8 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.9 Asbestos Removal – Asbestos-Containing Vinyl Floor Tile Mastic with HEPA Filtered Power Tools/Machine

- .1 Use the procedures described above under *Site Preparation – Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Turn on HEPA vacuum. Vacuum to remain operation throughout work.
- .4 Grind mastic completely to bare concrete using a grinder with a HEPA filtered dust collection device.
- .5 Place removed ACM directly into an asbestos waste container.
- .6 If power tool can disconnect from HEPA vacuum, remove tool, and HEPA vacuum tool and bit, blade, etc, and shrouds.
- .7 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.
- .8 HEPA vacuum or wet wipe entire work area on completion of work.

3.10 Application of Post Removal Sealant

- .1 Apply one coat of Post Removal Sealant with an airless sprayer, in accordance with Manufacturer's Instructions, to cover all surfaces on all items in the Abatement Work Area, including but not limited to polyethylene, ACM substrate, structural steel, and surfaces scheduled for demolition.
- .2 Do not apply post removal sealant to materials that will be damaged by its application.

3.11 Abatement Work Area Dismantling

- .1 Wash or HEPA vacuum equipment and tools used in contaminated Abatement Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Abatement Work Area.
- .2 Place tools and equipment used in contaminated work site but not cleaned in

polyethylene bags prior to removal from Abatement Work Area.

- .3 Clean polyethylene sheeting and drop sheets which with HEPA vacuum or wet cleaning methods at completion of work.
- .4 Wet drop sheets and polyethylene sheeting.
- .5 Carefully roll polyethylene sheeting and drop sheets toward the centre of enclosure. As polyethylene is rolled away, immediately remove visible debris beneath with a HEPA vacuum.
- .6 Remove remaining polyethylene sheeting and tape, and dispose of as asbestos waste.
- .7 Place polyethylene sheeting, drop sheets, tape, disposal clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.
- .8 Remove remaining site isolation, seals, tape, etc.
- .9 Remove Transfer Room.
- .10 Remove seals, tape, Signage etc.
- .11 Immediately upon shutting down negative air units, seal air inlet grill and exhaust vent with polyethylene and tape.
- .12 Seal openings in HEPA vacuums.
- .13 Remove and dispose of the pre-filters from HEPA filtered negative pressure machines as asbestos waste.
- .14 Remove HEPA filtered negative pressure machines and discharge ducting or HEPA vacuums.
- .15 Remove temporary lights.
- .16 Place contaminated materials including polyethylene sheeting, drop sheets, seals, tape, disposable coveralls, and other contaminated waste in asbestos waste containers.

3.12 Waste and Material Handling

- .1 Refer to Section 02 81 00.

3.13 Re-Establishment of Items

- .1 Upon completion of work:
 - .1 Move items that were removed from Abatement Work Area prior to work, back into same location within Abatement Work Area.
 - .2 Remove and disconnect tags and locks from electrical panels and re-energize equipment and items.
 - .3 Remove negative air discharge panel and reinstall glazing to match existing.
 - .4 Reinstall ducts removed to perform cleaning of ducts or to access ACM.
 - .5 Clean, mop and vacuum Abatement Work Area and area beneath Decontamination Facilities.
 - .6 Enable building air handling systems.

END OF SECTION

PART 1 GENERAL

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.
- .2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of lead-containing materials following Class 1 or Low Risk procedures, and Pinchin and Owner specific requirements.
- .3 Comply with requirements of this Section when performing following Work:
 - .1 Removal of lead-containing surface coatings with a chemical gel, stripper or paste.
 - .2 Removal of materials coating with lead-containing surface coatings, using non-powered hand tools, where the materials remains primarily intact, and is not crumbled, pulverized or powdered.

1.3 Instruction and Training

- .1 Provide instruction and training to all workers including the following:
 - .1 Hazards of lead.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section including decontamination of the worker.
 - .5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

- .1 Provide non-powered half-face respirators with P100 high efficiency cartridge filters when requested by personnel.
- .2 Provide protective clothing, when requested by personnel, entering the Abatement Work Area, including:
 - .1 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.

- .3 Provide protective clothing, to all personnel entering the Abatement Work Area, including:
 - .1 Dust impermeable gloves appropriate for the work being completed.
- .4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.
- .5 Lead-specific soaps and hygiene indicators are recommended to be provided for shower and hand-wash stations.

1.5 Inspections

- .1 Refer to Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

2.2 Curtained Doorways

- .1 Construct as follows:
 - .1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area.
 - .2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.
 - .3 Install weights attached to bottom edge of each door flap.
 - .4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Provide washing facilities consisting of a wash basin, clean water, soap and towels.
 - .1 Workers are to use washing facilities each time leaving the Abatement Work Area.
- .2 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.
- .3 Shut down HVAC systems serving the Abatement Work Area.
 - .1 Install polyethylene sheeting over openings in ducts and diffusers and seal.
 - .2 HVAC to remaining areas of building must not be disrupted during work of this section.
 - .3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.
 - .4 Perform work at scheduled times after shutting down HVAC systems affecting

the Abatement Work Area.

- .4 Remove visible dust from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .5 Provide amended water for wetting materials, and adequate method of wetting (garden sprayers, airless sprayers, etc.).
- .6 Do not use compressed air to clean or remove dust or debris.
- .7 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .8 Frequently and at regular intervals, place all waste in waste containers.
- .9 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.2 Site Preparation – No Enclosure Required

- .1 Isolate Abatement Work Area with barrier tape.
- .2 Protect floor surfaces covered from wall to wall with polyethylene sheets.
- .3 Maintain Abatement Work Area in tidy condition.
- .4 Remove waste and debris frequently.
- .5 Remove standing water on polyethylene/floor at the end of every shift.
- .6 Turn off water supply to hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.3 Lead-Containing Paint Abatement

- .1 Removal methods minimizing dust generation should be used wherever possible.
 - .1 Wet methods are to be used to reduce dust generation.
 - .2 Wetting agents should be used where possible.
 - .3 Wet methods are not to be used if it creates a hazard or cause damage to equipment or to project.
- .2 Provide drop sheets below all lead operations that may produce dust, chips or debris containing lead.
- .3 Waste water from cleaning or removal operations must be contained, for treatment or disposal.
- .4 Remove lead-containing paint in small sections and pack as it is being removed in sealable lead waste containers.
- .5 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.
- .6 After wire brushing and wet sponging to remove visible lead-containing paint, wet clean entire work area, and equipment used in process.
 - .1 Compressed air or dry sweeping not be used to clean up lead-containing dust or waste.

- .2 Ensure all waste is cleaned and packaged.
- .7 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside.

3.4 Waste Management and Disposal

- .1 Per Section 02 81 00.

3.5 Final Cleaning

- .1 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .2 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .3 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

END OF SECTION

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PART 1 GENERAL

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.
- .2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of lead-containing materials following Class 2 or Moderate Risk procedures, and Pinchin and Owner specific requirements.
- .3 Comply with requirements of this Section when performing following Work:
 - .1 Removal of lead containing paint using power tools with an effective dust collection system equipped with HEPA filter.
 - .2 Removal of lead-containing surface coatings or materials by scraping or sanding (including wet sanding) using non-powered hand tools.

1.3 Instruction and Training

- .1 Provide instruction and training to all workers including the following:
 - .1 Hazards of lead.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section including decontamination of the worker.
 - .5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

- .1 Provide the following respiratory protection to all personnel, at minimum:
 - .1 Non-powered half-face respirators with P100 high efficiency cartridge filters.
- .2 Provide protective clothing, to all personnel entering the Abatement Work Area, including:
 - .1 Dust impermeable gloves appropriate for the work being completed.

- .2 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
- .3 Provide protective clothing, to all personnel entering the Abatement Work Area.
- .4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.
- .5 Lead-specific soaps and hygiene indicators are recommended to be provided for shower and hand-wash stations.

1.5 Inspections

- .1 Refer to Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

2.2 Curtained Doorways

- .1 Construct as follows:
 - .1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Transfer Room.
 - .2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.
 - .3 Install weights attached to bottom edge of each door flap.
 - .4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Provide washing facilities consisting of a wash basin, clean water, soap and towels.
 - .1 Workers are to use washing facilities each time leaving the Abatement Work Area.
- .2 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.
- .3 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.

- .4 Shut down HVAC systems serving the Abatement Work Area.
 - .1 Install polyethylene sheeting over openings in ducts and diffusers and seal.
 - .2 HVAC to remaining areas of building must not be disrupted during work of this section.
 - .3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.
 - .4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.
- .5 Remove visible dust from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .6 Provide amended water for wetting materials, and adequate method of wetting (garden sprayers, airless sprayers, etc.).
- .7 Provide electrical power and shut off for operation of powered tools and equipment. Provide ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard.
 - .1 Ensure safe installation of electrical lines and equipment.
- .8 Do not use compressed air to clean or remove dust or debris.
- .9 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .10 Frequently and at regular intervals, place all waste in waste containers.
- .11 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.2 Site Preparation –Enclosure Required

- .1 Install Curtained Doorways.
- .2 Install polyethylene sheeting at openings in walls (as required) and seal.
- .3 Seal openings in floor using tape, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.
- .4 Install polyethylene sheeting on floors of Abatement Work Area. Use sufficient layers to provide adequate protection for carpeting and equipment.
 - .1 Cover floors first so that polyethylene on walls is overlapped by at least 305 mm.
- .5 Install 6 mil polyethylene sheeting on walls to remain, within the Abatement Work Area., including existing walls that make up, or are within, the Abatement Work Area.
- .6 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged.
- .7 Place required tools to complete the abatement with the Abatement Work Area.
- .8 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .9 Establish negative pressure in Abatement Work Areas as follows:

- .1 Provide sufficient HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Abatement Work Area a minimum of every 20 minutes.
- .2 Provide additional HEPA filtered negative pressure machines as required to ensure air flow from Occupied Area into Abatement Work Area.
- .3 Operate HEPA filtered negative pressure machines continuously from first disturbance of lead-containing material until completion of dismantling.
- .4 Replace prefilters to maintain specified flow rate.
- .5 Replace HEPA filter as required to maintain flow rate and integrity of unit.
- .6 Discharge HEPA filtered negative air machines to building exterior, where possible.
 - .1 Direct discharge away from building access points.
- .10 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of lead hazard, and lead hazard where appropriate.

3.3 Site Preparation – No Enclosure Required

- .1 Cover materials to remain in the Abatement Work Area with polyethylene sheeting before disturbing lead-containing materials to control the spread of dust.
- .2 Install caution tape around work area where existing walls are not present.
- .3 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .4 Place HEPA vacuum in Abatement Work Area.
- .5 Place required tools to complete the abatement within the Abatement Work Area.
- .6 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of a lead dust hazard.

3.4 Maintenance of Abatement Work Area

- .1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.
- .3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.
- .4 Maintain Abatement Work Area in tidy condition.
- .5 Remove standing water on polyethylene/floor at the end of every shift.
- .6 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.5 Lead Abatement

- .1 Use the procedures described above under *Site Preparation – Enclosure Required*.

- .1 Removal of lead-containing surface coatings or materials by scraping or sanding (including wet sanding) using non-powered hand tools.
- .2 Use the procedures described above under *Site Preparation – No Enclosure Required*.
 - .1 Removal of lead containing paint using power tools with an effective dust collection system equipped with HEPA filter.
- .3 Provide washing facilities consisting of a wash basin, clean water, soap and towels.
 - .1 Workers are to use washing facilities each time leaving the Abatement Work Area.
- .4 Removal methods minimizing dust generation should be used wherever possible.
 - .1 Wet methods are to be used to reduce dust generation.
 - .1 Wetting agents should be used where possible.
 - .2 Wet method not be used if it creates a hazard or cause damage to equipment or to project.
- .5 Provide drop sheets below all lead operations that may produce dust, chips or debris containing lead.
- .6 Waste water from cleaning or removal operations must be contained, for treatment or disposal.
- .7 Remove lead containing paint in small sections and pack as it is being removed in sealable waste containers.
- .8 Waste generated should be maintained wet until cleaned and packaged.
- .9 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.
- .10 After wire brushing and wet sponging to remove visible lead containing paint, wet clean entire work area, and equipment used in process.
 - .1 Compressed air or dry sweeping not be used to clean up lead-containing dust or waste.
 - .2 Ensure all waste is cleaned and packaged.
- .11 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside. Ensure containers are removed by workers who have entered from uncontaminated areas dressed in clean coveralls.

3.6 Waste Management and Disposal

- .1 Per Section 02 82 00.

3.7 Final Cleaning

- .1 Following specified cleaning procedures, proceed with final cleanup.

- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Clean visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and seal. Dispose of in accordance with waste materials generated.
- .4 Clean Work areas and Transfer Room, where present.
- .5 Remove sealed waste containers and equipment used in Work and remove from work areas at appropriate time in cleaning sequence.
- .6 Conduct final check to ensure no dust or debris remain on surfaces as result of dismantling operations.

END OF SECTION

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Part 1 General

1.1 GENERAL REQUIREMENTS

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

1.2 WORK IN OTHER SECTIONS

.1 Related Work Specified in Other Sections

Section 03 20 00	:	Concrete Reinforcement
Section 03 30 00	:	Cast-in-Place Concrete
Section 03 35 00	:	Specialty Finished Concrete

1.3 REFERENCE STANDARDS

CSA-A23.1-19: Concrete Materials and Methods of Concrete Construction
CSA-A23.2-19: Test Methods and Standard Practices for Concrete
CSA S269.1-16 (R2021): Falsework and Formwork for Construction Purposes

1.4 CO-ORDINATION

- .1 Install anchors, sleeves, bolts, inserts, drains, expansion joint components and other items supplied under other sections of the specifications required to be built into, anchored to, or passing through concrete work, in co-ordination with the other trades.
- .2 Supply templates for setting all anchorages required for the buildings and shelters.

1.5 DESIGN OF FORMWORK

- .1 Assume full responsibility for the complete structural design and construction of formwork including shoring and bracing to resist vertical and horizontal loads due to the weight of wet concrete, self-weight of forms, wind, fluid pressure of concrete, and other forces arising from equipment used in placing the concrete.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Place materials defined as hazardous or toxic waste in designated containers.
- .2 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .3 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

Part 2 Products

2.1 MATERIALS

- .1 Formwork Lumber: Plywood and wood formwork materials to CAN/CSA-A23.1/A23.2 latest edition. Formwork materials used on site shall be new and acceptable to the Consultant, prior to erection. Panels shall be fabricated for use as form panels, finished one side, with sealed edges and a minimum thickness of 19mm. Panels shall be smooth and free from defects which would show up on concrete surfaces exposed to view.
- .2 Formwork Liner: Plastic laminate, vinyl, polyethylene, neoprene or approved products new and acceptable to the Consultant to provide the surface texture and forms required for the design as shown.
- .3 Form Coating: Formaseal as manufactured by Master Builders for wood forms and as recommended by manufacturer for form liner.
- .4 Form stripping agent: CPD colourless non-staining odourless or as recommended by manufacturer of form liner.
- .5 Joint Tape: non staining, water impermeable, self-releasing, where required.
- .6 Form ties: removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface, and not leaving metal closer than 25 mm to the surface of the concrete for walls. Snap tie length shall suit wall thickness as noted on drawings.
- .7 Tie Hole Plugs: 25mm dia. tapered PVC hole plugs to be provided on all exposed walls.
- .8 Form Ties/Supports: External clamping devices to retain form tight, uniform and easily removable around all columns.

Part 3 Execution

3.1 ERECTION

- .1 Verify lines, levels and column centres before proceeding with formwork and ensure dimensions agree with drawings.
- .2 Construct forms to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA-A23.1, and to produce acceptable finish where exposed.
- .3 Construct falsework in accordance with CSA S269.1.
- .4 Obtain approval from soils testing engineer for bearing surfaces prior to erection of forms.

- .5 Obtain Consultant's approval for use of earth forms.
- .6 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .7 Align form joints and make watertight. Keep form joints to minimum.
- .8 Use (25) mm chamfer strips on external corners of beams, joints, columns, walls etc., exposed to view.
- .9 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .10 Provide blocking and anchorage for hollow metal frames set to be cast into forms.
- .11 Clean formwork in accordance with CAN/CSA-A23.1 before placing concrete.
- .12 Forms shall remain in place for a minimum duration of 48 hours for footings, curbs, etc. and all other non-self-supporting structural components.
- .13 Forms shall remain in place for a minimum of 72 hours for all columns.
- .14 Re-use of formwork and falsework subject to requirements of CAN/CSA-A23.1.
- .15 Be responsible for the safety of the structure, both before and after the removal of forms, until the concrete has reached its specified 28-day strength.
- .16 When forms are stripped during the curing period, cure and protect the exposed concrete in accordance with Section 03 30 00.
- .17 Movement and displacement of formwork during construction, variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by specified methods will be considered defective work performed by this Section.
- .18 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost to the Owner.

END OF SECTION 03 10 00

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 01 Landscape Cast-in-Place Concrete
- .2 Section 32 13 13 Concrete Paving and Edges

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA)
 - .1 CSA-A23.1-[14] /A23.2-[14] , Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA S269.1-[16] , Falsework and Formwork.
 - .3 CAN/CSA-S269.3-[M92(R2003)] , Concrete Formwork.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in formwork and coatings and include product characteristics, performance criteria, physical size, finish, and limitations.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect formwork from damages.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Formwork materials:
 - .1 Use formwork materials to CSA-A23.1/A23.2.
- .2 Tubular forms: round, diameter as indicated.
 - .1 Sonotube or equivalent.

- .3 Form ties:
 - .1 For vertical landscape architectural concrete seat walls; snap ties complete with plastic cones and light grey concrete plugs.
- .4 Form panels:
 - .1 Plywood: new, medium density overlay plyform
- .5 Form release agent: Proprietary, non volatile material not to stain concrete or impair subsequent application of finishes or coatings to surface of concrete, derived from agricultural sources, non petroleum containing, low VOC and non-toxic.
- .6 Falsework materials: to CSA-S269.1.

Part 3 Execution

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels, and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1.
- .3 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .4 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
- .5 Use 25 mm chamfer strips on external corners and 25 mm fillets at interior corners, joints, unless specified otherwise.
- .6 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .7 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .8 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

3.2 REMOVAL AND RESHORING

- .1 Remove formwork when concrete has reached 70% of its 28 day design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.
- .2 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

3.3 CLEANING

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

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

1.2 WORK IN OTHER SECTIONS

- .1 Related Work Specified in Other Sections

Section 03 10 00 : Concrete Formwork & Accessories
Section 03 30 00 : Cast-in-Place Concrete
Section 03 35 00 : Specialty Finished Concrete

1.3 REFERENCE STANDARDS

CSA-A23.1-19: Concrete Materials and Methods of Concrete Construction
CSA-A23.2-19: Test Methods and Standard Practices for Concrete
CSA A23.3-19: Design of Concrete Structures
CSA G30.18-21 Carbon Steel Bars for Concrete Reinforcement
ACI 315-18: Guide to Presenting Reinforcing Steel Design Details
CSA-W186:21: Welding of Reinforcing Bars in Reinforced Concrete Construction

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 30 00.
- .2 Indicate bar sizes, spacing, location and quantities of reinforcement, mesh, mechanical splices, chairs, spacers and hangers with identifying code marks to permit correct placement without reference to structural drawings; (to Reinforcing Steel Manual of Standard Practice - Metric Supplement 2004 by Reinforcing Steel Institute of Ontario).
- .3 Detail placement of reinforcing where special conditions occur.
- .4 Design and detail lap lengths and bar development lengths to CSA-A23.3, unless otherwise indicated.

1.5 SUBSTITUTES

- .1 Substitution of different size bars permitted only upon written approval of the Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Reinforcing Steel: billet steel, deformed bars to CAN/CSA G30.18-21. Use Grade 400R bars for all reinforcing unless noted otherwise, to sizes as shown on the drawings.
- .2 Welded Wire Fabrics: Where no reinforcement is shown, provide 152 x 152 MW 18.7 x MW 18.7 (6" x 6" x 6/6) welded wire fabric at 37mm (1½ ") below the finished surface of slabs on

grade or walks, or toppings 62mm (2½") in thickness or greater. Lap ends and sides of fabric in accordance with requirements of CSA Standard CAN/CSA-A23.1, but in any event, not less than 300mm (12").

Part 3 Execution

3.1 FABRICATION

- .1 Fabricate reinforcing in accordance with CSA-A23.1.
- .2 Obtain Consultant's approval for locations of reinforcement splices other than shown on steel placing drawings.
- .3 Ship bundles of bar reinforcement, clearly identified in accordance with bar list.

3.2 STORAGE OF REINFORCING

- .1 Reinforcing shall be stored off the ground to keep it free from dirt and to maintain its fabricated form.

3.3 FIELD BENDING

- .1 Do not field bend reinforcement except where indicated or authorized by the Consultant.
- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars which develop cracks or splits.

3.4 PLACING

- .1 Place reinforcing steel as indicated on reviewed shop drawings and in accordance with CSA-A23.1 latest edition.
- .2 Obtain Engineer's approval of reinforcing steel and position.
- .3 Locate reinforcing bars to provide proper concrete cover. Reinforcing cover will be carefully inspected by the Consultant, and reinforcing with inadequate cover will not be acceptable.
- .4 Fold all the wires behind bars, away from form faces.
- .5 Modify bars on site to accommodate box-outs, inserts, etc., as directed by the Consultant.

3.5 FIELD CUTTING OF REINFORCING

- .1 Field cut reinforcing bars only where permitted by the Consultant.

END OF SECTION 03 20 00

Part 1 General

1.1 GENERAL REQUIREMENTS

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

1.2 WORK IN OTHER SECTIONS

- .1 Related Work Specified in Other Sections

Section 03 10 00	:	Concrete Formwork & Accessories
Section 03 20 00	:	Concrete Reinforcement
Section 04 20 00	:	Unit Masonry
Section 05 10 00	:	Structural Metal Framing
Section 05 50 00	:	Metal Fabrications

1.3 REFERENCE STANDARDS

CSA-A23.1-19 – Concrete Materials and Methods of Concrete Construction
CSA A23.2-19 – Test Methods and Standard Practices for Concrete
CSA G30.18-21: Carbon steel bars for concrete reinforcement
ASTM A820/A820M-16, Standard Specification for Steel Fibres for Fibre Reinforced Concrete

1.4 SAMPLES

- .1 At least (3) weeks prior to commencing work, inform the Consultant of the proposed mix design and proposed source of ready mixed concrete.
- .2 A sample of the finishes shall be prepared and remain as the minimum acceptable standard for the project.

1.5 CERTIFICATES

- .1 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1.
- .2 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA-A23.1.

1.6 QUALITY ASSURANCE

- .1 The Contractor shall employ an independent inspection and testing company to carry out all testing and inspection as required. The Consultant will appoint the inspection and testing company. The cost of inspection and testing shall be paid by the Contractor, out of the Cash Allowance carried for this testing under Division 1.
- .2 Samples and methods of moulding shall conform to the requirements of CSA-A23.2.

- .3 Additional testing shall be made if there is a distinct change in job conditions or if required by the Consultant or the authority having jurisdiction.
- .4 Compression tests shall be performed in accordance with CSA-A23.2 and good practice.
- .5 Failure to meet strength requirements will result in rejection of materials, strengthening or replacement of those portions that failed to develop the specified strength.
- .6 Concrete slump shall be tested at time that cylinders are cast and at such other times deemed necessary.
- .7 The addition of water and admixtures on the site is hereby prohibited and unacceptable for the project.

1.7 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 30 00 Submittals.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Designate a cleaning area for tools to limit water use and runoff.
- .2 Carefully coordinate the specified concrete work with weather conditions.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .4 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, non-combustible material and remove for disposal. Dispose of all waste in accordance with applicable local, provincial and national regulations.
- .5 Choose least harmful, appropriate cleaning method which will perform adequately.

Part 2 Products

2.1 MATERIALS

- .1 Formwork: As specified in Section 03 10 00.
- .2 Formwork Lumber:
 - .1 Plywood and wood formwork materials to CSA-A23.1. Formwork materials brought on site shall be new.
 - .2 Panels shall be fabricated for use as form panels, finished one side with form coating, with sealed edges and a minimum thickness of 19mm.
- .3 Panels shall be smooth and free from defects which would show up on concrete surfaces exposed to view.

- .4 Form Coating: Formaseal, as manufactured by Sternson Construction Products.
- .5 Joint Tape: Non-staining, water impermeable, self-releasing.
- .6 Form Ties: Removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25mm diameter in concrete surface, and not leaving metal closer than 25mm to the surface of the concrete.
- .7 Tie Hole Plugs: 25mm dia. tapered P.V.C. hole plugs.
- .8 Reinforcing Steel: As specified in Section 03200.
- .9 Reinforcing Steel: Billet steel, grade 400R, deformed bars to CAN/CSA-G30.18-09 to sizes shown on structural drawings. Where none is shown, provide 15M bars at 300mm centres as minimum steel.
- .10 Wire Mesh: Welded Wire Fabric to sizes and locations shown on drawings. Where none is shown, provide 152x152xMW18.7xMW18.7 W.W.F. one layer as minimum.
- .11 Water: to CSA-A23.1.
- .12 Aggregates: To CSA-A23.1. Coarse aggregates to be normal density. Use blend of 10mm and 20mm for coloured patterned concrete slabs.
- .13 Air Entraining Admixture: To CAN CSA A3000-18.
- .14 Chemical Admixtures: To CAN/CSA A3000-18 water reducing type WN. Consultant to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .15 Colour Admixtures: Integral coloured pigments to C-979-86. Two (2) colours to be selected by Consultants from manufacturer's standard range.
- .16 Non-Shrink Grout: Sternson M-Bed Superflow or approved equal.
- .17 Floor Hardener: Surfex TR trap rock hardener, shake on, by Euclid Chemical Company. Application rate of 5kg/m² (1.0 lb/ft²).
- .18 Interior Cure and Seal Compound: Interior slabs shall be W. R. Meadows "Intex". No resin-based compounds will be accepted.
- .19 Exterior Cure and Seal Compound: Exterior concrete slabs and gutters shall be W. R. Meadows "Sealtight CS-309".
- .20 Expansion Joint Filler: Shall be Sealtight asphalt expansion joint filler, W. R. Meadows.
- .21 Joint and Sawcut Filler: Shall be Loadflex by Sika or Jointflex by CPD.
- .22 Joint Tape: Shall be Sealtight Gusset Tape by W. R. Meadows.
- .23 Premoulded Membrane: Shall be Sealtight 7100-312 (PMPC), W. R. Meadows.

2.2 CONCRETE MIXES

- .1 Proportion normal density concrete in accordance with CSA A23.1, to give following properties for concrete in footings, and any other unspecified concrete:
 - .1 Cement: Type GU Portland cement.
 - .2 Maximum 25% slag cement content.
 - .3 Minimum compressive strength at 28 days: 25 MPa.
 - .4 Nominal size of coarse aggregate: 20 mm.
 - .5 Slump at time and point of discharge: 50 to 100 mm.
 - .6 Air content: 0 to 3%.
- .2 Proportion normal density concrete in accordance with CSA-A23.1, to give following properties for piers:
 - .1 Cement: Type GU Portland cement.
 - .2 Maximum 25% slag cement content.
 - .3 Minimum compressive strength at 28 days: 25 MPa.
 - .4 Nominal size of coarse aggregate: 20 mm.
 - .5 Slump at time and point of discharge: 60 to 100 mm.
 - .6 Air content: 5 - 8% maximum.
 - .7 Class of exposure: F-2.
- .3 Proportion normal density concrete in accordance with CSA-A23.1, to give following properties: for concrete in precast concrete toppings:
 - .1 Cement: Type GU Portland cement.
 - .2 Maximum 25% slag cement content.
 - .3 Minimum compressive strength at 28 days: 25 MPa.
 - .4 Nominal size of coarse aggregate: 10 mm.
 - .5 Slump at time and point of discharge: 60 to 100 mm.
 - .6 Air content: 0 - 3% maximum.
- .4 Proportion normal density concrete in accordance with CSA-A23.1, to give following properties: for concrete in exterior structural slabs and sidewalks/curbs:

- .1 Cement: Type GU Portland cement.
 - .2 Maximum 25% slag cement content.
 - .3 Minimum compressive strength at 28 days: 32 MPa.
 - .4 Class of exposure: C-2.
 - .5 Nominal size of coarse aggregate: 20 mm.
 - .6 Slump at time and point of discharge: 60 to 100 mm.
 - .7 Air content: 5 to 8%.
- .5 Proportion normal density concrete in accordance with CSA-A23.1, to give following properties: for concrete in grouted masonry blocks.
- .1 Cement: Type GU Portland cement.
 - .2 Maximum 25% slag cement content.
 - .3 Minimum compressive strength at 28 days: 20 MPa.
 - .4 Nominal size of coarse aggregate: 10 mm.
 - .5 Slump at time and point of discharge: 50 to 100 mm.
 - .6 Air content: 0 - 3% maximum.
- .6 Proportion normal density concrete in accordance with CSA-A23.1, Alternative 1 to give following properties: for concrete fill.
- .1 Cement: Type GU Portland cement.
 - .2 Maximum 25% slag cement content.
 - .3 Minimum compressive strength at 28 days: 10 MPa.
 - .4 Nominal size of coarse aggregate: 20 mm.
 - .5 Slump at time and point of discharge: 100 mm.
 - .6 Air content: 0 - 4% maximum.
- .7 Proportion normal density concrete in accordance with CSA-A23.1 to give following properties for concrete slab on grade:
- .1 Cement Type GU Portland cement.
 - .2 Maximum 25% slag cement content.

- .3 Nominal size of coarse aggregate 20 mm.
- .4 Slump at time and point of discharge: 60-100mm.
- .5 Minimum compressive strength at 28 days of 25 MPa.
- .6 Air content: 0 to 3%.
- .8 Do not change job mix formula without prior approval of the Consultant.
- .9 In addition to 28 day strength tests, 7 days test may be carried out. If average strength at 7 days is less than 70% of specified 28 day strength, check mix at once and adjust to ensure required strength is obtained.

Part 3 Execution

3.1 WORKMANSHIP

- .1 All concrete shall be as set forth in CSA-A23.1 and shall be composed of cement, fine and coarse aggregates and water.
- .2 Concrete shall be delivered and discharged within 1½ hours after the introduction of the mixing water at the batch plant.
- .3 Mixing, placing, compaction, curing, hot and cold weather protection shall conform to CSA-A23.1. Use power vibrators in sufficient number and in location and duration to the Consultant's complete satisfaction as required.
- .4 Obtain the Consultant's approval before placing concrete. Provide 24 hour notice prior to placing of concrete.
- .5 Pumping of concrete is permitted only after approval of equipment and mix.
- .6 Ensure reinforcement and inserts are not disturbed during concrete placement in order to maintain proper coverage.
- .7 Prior to placing of concrete obtain the Consultant's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .8 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .9 Do not place load upon new concrete until authorized by the Consultant.

3.2 FORMWORK

- .1 Verify lines, levels and column centres before proceeding with formwork and ensure dimensions agree with drawings.

- .2 Construct forms to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1.
- .3 Align form joints and make watertight. Keep form joints to minimum.
- .4 Use 25mm chamfer strips on all vertical and horizontal corners of exterior retaining walls as indicated on drawings.
- .5 All surfaces of formwork which face concrete, which will be exposed to view are to be coated with protective form coating to minimize transfer of wood grain to finished concrete.
- .6 Clean formwork in accordance with CSA-A23.1 before placing concrete.
- .7 Re-use of formwork is subject to requirements of CSA-A23.1.
- .8 When forms are stripped during the curing period, cure and protect the exposed concrete.
- .9 Movement and displacement of formwork during construction, variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by specified methods will be considered defective work performed by this Section.
- .10 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost to the Owner.

3.3 INSERTS

- .1 Co-ordinate and verify that the Electrical Contractor has set all ducts, boxes and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100 mm not indicated on structural or civil drawings must be approved by the Consultant.
- .2 Co-ordinate and verify that the Mechanical Contractor has set all floor drains, cleanouts, trench drains to provide a smooth, flush appearance with the '**FINISHED FLOOR SURFACE**' and to ensure a positive and uniform slope towards the drains.
- .3 Do not eliminate or displace reinforcement to accommodate inserts or hardware. If inserts cannot be located as specified, obtain approval of all modifications from the Consultant before placing of concrete.
- .4 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete. With the Consultant's approval, grout anchor bolts in preformed holes or holes drilled after concrete has set. Formed holes to be at least 100 mm in diameter. Drilled holes to be minimum 25 mm larger in diameter than bolts used. Protect anchor bolt holes from water accumulations. Set bolts and fill holes with non-shrink grout or epoxy (as noted on drawings).
- .5 Set hollow metal frames, plumbed, squared and braced with blocking in locations shown on drawings.

3.4 GROUTING

- .1 Grout underside of steel column bearing plates with non-shrinking grout to manufacturer's

instructions. Place grout to cover steel shims left in place.

3.5 FINISHING

- .1 Finish all concrete surfaces in accordance with Section 03 35 00.

3.6 EXPANSION CONTROL

- .1 Expansion Joints: Install expansion joint material between slabs on grade and masonry walls, for interior slabs and at max. 6000mm spacing for exterior slabs and curbs, and between slabs on grade and concrete curbs.
- .2 Control Joints: Sawcut control joints at a maximum spacing of 3000mm in each direction and where noted on drawings. Cut joints within 24 hours of placing and to a depth as detailed on drawings.

3.7 PRECAST CONCRETE SLAB TOPPINGS

- .1 Install structurally bonded 50 ± thick precast slab toppings as detailed on structural drawings.
- .2 Bond concrete topping to precast concrete slabs via latex modified bonding agent installed in strict compliance with manufacturer's recommendations.
- .3 Finish concrete toppings true, level, and smooth via power float and power trowel unless indicated otherwise.
- .4 Provide depressions and roughened surfaces in designated areas as required to accommodate special consultantural floor finishes.

3.8 WATER/VAPOUR CONTROL

- .1 Butt joints tight together and tight to foundation wall. Seal all joints with gusset tape including foundation wall junctions.
- .2 Protect during placing of concrete to ensure the integrity of the barrier is maintained. Repair immediately any penetrations or areas damaged in accordance with the manufacturer's recommendations.

3.9 CURING AND PROTECTION

- .1 Cure and protect newly finished slabs and steps in accordance with CSA A23.1.
- .2 Coat exterior slabs, curbs with curing compound and leave for 30 days. Apply sealer after curing period has expired.
- .3 Cure finished concrete surfaces in a manner which will leave the surface with a uniform appearance and with a minimum of discolouration after drying. Ensure that curing compounds

are compatible with adhesives for finishes to be applied later.

- .4 For all concrete slabs that are to remain exposed, curing compound is to be applied at a rate required for use as a sealer/hardener, in accordance with the manufacturer's instructions.

3.10 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Consultant in accordance with CSA-A23.1.
- .2 The Consultant will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .3 Inspection or testing by Consultant will not augment or replace contractor quality control nor relieve him of his contractual responsibility.

3.11 TOLERANCES

- .1 Cast-in-Place concrete shall be constructed within the dimensional tolerances specified in CSA-A23.1, as specified elsewhere in this section. Concrete floor slabs shall be constructed as moderately flat slabs and within the tolerances listed below.
- .2 Conform in line, level and plumbness to the following tolerances. These are maximum values.
- .3 Variation from vertical, in lines and surfaces of walls piers:

:	In height of 3m (10')	-	6mm (1/4")
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- .4 Variation from level or from grades shown in floors grade:

:	In any 3m (10')	-	3mm (1/8")
:	In any bay up to 6m (20')	-	6mm (1/4")
:	In any 12m (40')	-	12mm (1/2")
- .5 Variation from straight or from correct position in walls:

:	In length up to 6m (20')	-	12mm (1/2")
:	In any 12m (40')	-	12mm (1/2")
- .6 Variation in size and location of sleeves, floor open and the like and in location of bolts, inserts and fastenings:

:		-	6mm (1/4")
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- .7 Variation in location of bolts, inserts, sleeves and fastenings when in group:

: - 3mm (1/8")

.8 Variation in cross-section of slabs, walls and piers:

: Maximum oversize - 12mm (1/2")

: Maximum undersize - 6mm (1/4")

.9 There shall be no variations from required level at junction of walls and floors.

.10 Where drains occur, floors shall be properly and uniformly sloped to allow complete drainage of the area.

3.12 DUCT BANK (INTERIOR)

.1 Excavate to elevations shown and form duct bank as shown on electrical drawings.

.2 Place reinforcing steel as shown. Electrical Contractor to place ducts.

.3 Place coloured concrete and finish top surface with wood float.

3.13 DEFECTIVE CONCRETE

.1 Concrete is defective when:

.1 Containing visible honeycombing or embedded debris.

.2 Concrete damaged by freezing or which is unsatisfactory due to placement at too high a temperature.

.3 Average 28-day strength of any three consecutive strength tests is less than specified minimum 28-day strength.

.4 Any 28-day strength test result in less than 88% of specified minimum 28-day strength.

.5 Cracking occurs in locations other than at control and construction joints.

.6 Curing is not carried out strictly according to the specifications.

.2 Remove and reconstruct in entirety any defective concrete footing, slabs, walls as directed by the Consultant.

3.14 COLD WEATHER PROTECTION

.1 Refer to CSA Standards CSA-A23.1 and CSA-A23.2 Provisions and Publications. Include for tarped heated enclosures - no non-freeze additives such as calcium will be tolerated on this project.

END OF SECTION 03 30 00

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 10 01 Landscape Concrete Forming and Accessories
- .2 Section 32 13 13 Concrete Paving and Edges
- .3 Section 32 14 13 Precast Concrete Unit Paving

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C260/C260M-[10a(2016)] , Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309-[11] , Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M-[16] , Standard Specification for Chemical Admixtures for Concrete.
 - .4 ASTM C 881/C881M-[15] , Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
 - .5 ASTM C1017/C1017M-[13e1] , Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - .6 ASTM C C1059/C1059M-[13] , Standard Specification for Latex Agents for Bonding Fresh To Hardened Concrete.
 - .7 ASTM D412-[16] , Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
 - .8 ASTM D624-[2012] , Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
 - .9 ASTM D1751-[04(2013)e1] , Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - .10 ASTM D1752-[04a(2013)] , Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-[M86] , Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 CSA Group
 - .1 CSA A23.1/A23.2-[14] , Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA A283-[06-R2016] , Qualification Code for Concrete Testing Laboratories.
 - .3 CSA A3000-[13] , Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005),

1.3 ABBREVIATIONS AND ACRONYMS

- .1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement types:
 - .1 GU, GUb and GUL - General use cement.
 - .2 MS and MSb - Moderate sulphate-resistant cement.
 - .3 MH, MHb and MHL - Moderate heat of hydration cement.
 - .4 HE, HEb and HEL - High early-strength cement.
 - .5 LH, LHb and LHL - Low heat of hydration cement.
 - .6 HS and HSb - High sulphate-resistant cement.
- .2 Fly ash types:
 - .1 F - with CaO content maximum 8%.
 - .2 CI - with CaO content 15 to 20%.
 - .3 CH - with CaO minimum 20%.
- .3 GGBFS - Ground, granulated blast-furnace slag.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Landscape Cast-In-Place Concrete and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings: Submit complete reinforcement fabrication and installation shop drawings indicating location, bar size, dowels, lap length, placement and concrete coverage, and dimensions.
- .4 Site Quality Control Submittals:
 - .1 Provide testing and inspection reports for review by Consultant and do not proceed without written approval when deviations from mix design or parameters found.
 - .2 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.

1.5 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00- Quality Control.
- .2 Provide Consultant, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
 - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture meet specified requirements.

- .3 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by Consultant on following items:
 - .1 Falsework erection.
 - .2 Hot weather concrete.
 - .3 Cold weather concrete.
 - .4 Curing.
 - .5 Finishes.
 - .6 Formwork removal.
 - .7 Joints.
- .4 Quality Control Plan: provide written report to Consultant verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.
- .5 Mock-Ups:
 - .1 Provide site mock-up for finished concrete indicating forming methods and materials, and procedures proposed to achieve finish as shown on drawings, and to comply with following requirements, using materials indicated for completed work:
 - .1 Build mock-ups in location and of size as directed by Consultant.
 - .2 Obtain Consultant's acceptance of mock-ups before starting construction; mock-up used throughout construction period and used as standard of acceptance for subsequent architectural concrete work.
 - .3 Mock-up may form part of permanent structure when accepted by Consultant; repair or replace unacceptable mock-ups at no additional cost to Owner.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:
- .2 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 Modifying maximum time limit without receipt of prior written agreement from laboratory representative and concrete producer as described in CSA A23.1/A23.2. is prohibited.
 - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

1.7 SITE CONDITIONS

- .1 Placing concrete during rain or weather events that could damage concrete is prohibited.
- .2 Protect newly placed concrete from rain or weather events in accordance with CSA A23.1/A23.2.

- .3 Cold weather protection:
 - .1 Maintain protection equipment, in readiness on Site.
 - .2 Use such equipment when ambient temperature below 5°C, or when temperature may fall below 5°C before concrete cured.
 - .3 Placing concrete upon or against surface at temperature below 5°C is prohibited.
- .4 Hot weather protection:
 - .1 Protect concrete from direct sunlight when ambient temperature above 27°C.
 - .2 Prevent forms of getting too hot before concrete placed. Apply accepted methods of cooling not to affect concrete adversely.
- .5 Protect from drying.

Part 2 Products

2.1 MATERIALS

- .1 Portland Cement: GU or GUb to CSA A3001.
- .2 Supplementary cementing materials: fly ash (max 25%, Class F or CI), slag (Max 50%) or silica fume (max. 10% along or combination not exceeding 35% replacement) in accordance with CSA A3001 and CSA A23.1.
- .3 Water: to CSA A23.1.
- .4 Aggregates: to CSA A23.1/A23.2.
- .5 Admixtures:
 - .1 Air entraining admixture: to ASTM C260.
 - .1 Sika AER, as distributed by Sika.
 - .2 Chemical admixture: to ASTM C494. Consultant to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .6 Curing compound: to CSA A23.1/A23.2 and ASTM C309, Type 1-D or 2, meeting VOC regulations.
- .7 Premoulded joint fillers:
 - .1 Bituminous impregnated fibre board: to ASTM D1751.
- .8 Weep hole tubes: plastic or galvanized steel.
- .9 Concrete Bonding Agents: Latex to ASTM C1059/C1059M.
- .10 Reinforcing Steel:
 - .1 Concrete Seat Walls; #10M or #15M, epoxy coated continuous bars, placed as indicated on drawings.
 - .2 Flatwork and Raised Concrete Edges: Refer to Section 32 13 13 Concrete Paving and Edges.

- .11 Accessories:
 - .1 Seat Wall Anti-Skate Hardware: Gorilla Series-135, as manufactured by SkateStoppers. Clear anodize finish.
 - .1 Quantity: as required to complete installation as indicated on drawing details.

2.2 MIXES

- .1 Mix in accordance with CSA A23.1/A23.2.
 - .1 Ensure materials used in concrete mix have been submitted for testing and meet requirements of CSA A23.1.
 - .2 Co-ordinate construction methods to suit concrete mix proportions and parameters.
 - .3 Identify and report immediately to Consultant when concrete mix design and parameters pose anticipated problems or deficiencies related to construction.
 - .1 Class of exposure: C-2.
 - .2 Nominal size of coarse Aggregate: 19mm
 - .3 Admixture: chemical to ASTM C494/C494M.
 - .4 Water to cementing materials ratio (w/cm) : maximum 0.45 to CSA A23.1/A23.2
 - .5 Air content: 5-8%.
 - .6 Slump: 75 ± 15 mm at time and point of discharge. Maximum 120mm with approved superplasticizer.

2.3 COLOURED CONCRETE PIGMENT

- .1 “Granite Rock” 902012 as supplied by Dufferin Concrete or equivalent.

Part 3 Execution

3.1 PREPARATION

- .1 Obtain Consultant's approval before placing concrete.
 - .1 Provide consultant 24 hours minimum notice prior to placing of concrete.
- .2 Place concrete reinforcing accurately and secure in place.
- .3 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitate placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Pumping of concrete permitted only after approval of equipment and mix.
- .5 Disturbing reinforcement and inserts during concrete placement is prohibited.
- .6 Prior to placing of concrete obtain Consultant's approval of proposed method for protection of concrete during placing and curing in adverse weather.

- .7 Protect previous Work from staining.
- .8 Clean and remove stains prior to application for concrete finishes.
- .9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, workability, air content, temperature and test samples taken.
- .10 In locations where new concrete dowelled to existing work, drill holes in existing concrete.
 - .1 Place steel dowels and pack solidly with shrinkage compensating grout to anchor and hold dowels in positions as indicated.
- .11 Do not place load upon new concrete until authorized by Consultant.

3.2 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .2 Sleeves and inserts:
 - .1 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Consultant before placing of concrete.
 - .2 Confirm locations and sizes of sleeves and openings shown on drawings.
 - .3 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts:
 - .1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.
 - .2 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from Consultant.
 - .1 Drilled holes: to manufacturers' recommendations.
 - .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
 - .4 Set bolts and fill holes with shrinkage compensating grout.
 - .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .4 Drainage holes and weep holes:
 - .1 Form weep holes and drainage holes in accordance with Section 03 10 01- Landscape Concrete Forming and Accessories. If wood forms used, remove them after concrete has set.
 - .2 Install weep hole tubes and drains as indicated.
- .5 Finishing and curing:
 - .1 Finish concrete to CSA A23.1/A23.2.
 - .2 Use procedures as noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface not damaged.
 - .3 Use curing compounds compatible with applied finish on concrete surfaces.

- .4 Rub exposed sharp edges of concrete with carborundum to produce 3 mm minimum radius edges unless otherwise indicated.
- .5 Concrete Seat Wall: New plywood formed finish, smooth steel trowel top, with light sandblast.
- .6 Concrete Paving and Concrete Edges: Refer to Section 32 13 13.
- .6 Joint fillers:
 - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Consultant.
 - .2 When more than one piece required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
 - .3 Locate and form expansion joints as indicated.
 - .4 Install joint filler.
 - .5 Use 13 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12mm of finished slab surface unless indicated otherwise.

3.3 SURFACE TOLERANCE

- .1 Concrete tolerance to CSA A23.1, 3mm in 3m using straight edge method.

3.4 FIELD QUALITY CONTROL

- .1 Site tests: conduct tests as follows and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .1 Concrete pours.
 - .2 Slump.
 - .3 Air content.
 - .4 Compressive strength at 7 and 28 days.
 - .5 Air and concrete temperature.
- .2 Inspection and testing of concrete and concrete materials carried out by testing laboratory to CSA A23.1/A23.2.
 - .1 Ensure testing laboratory certified to CSA A283.
- .3 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.
- .4 Inspection or testing by Consultant not to augment or replace Contractor quality control nor relieve Contractor of contractual responsibility.

3.5 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for concrete floor hardeners, slip resistant coatings, and sheet curing materials.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 51 00 – Temporary Utilities
- .3 Section 03 33 00 – Cast-in-Place Concrete

1.3 REFERENCES

- .1 Health Canada - Workplace Hazardous Materials Information System (WHMIS)
 - .1 Safety Data Sheets (SDS).
- .2 CSA-A23.1-09: Concrete Materials and Methods of Concrete Construction

1.4 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit WHMIS SDS - Safety Data Sheets.
 - .1 WHMIS SDS acceptable to Human Resources Development Canada-Labour and Health Canada for concrete floor hardeners.
 - .2 Indicate VOC content.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard, packaging material in appropriate on-site bins for recycling.
- .3 Dispose of unused chemical additive materials at an official hazardous materials collections site approved by Consultant.
- .4 Unused chemical additive materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .5 Fold up metal banding, flatten and place in designated area for recycling.
- .6 Dispose of unused chemical additive materials at an official hazardous materials collections site approved by Consultant.

1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Temporary lighting:
 - .1 Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 m² of floor being finished.
- .2 Electrical power:
 - .1 Sufficient electrical power to operate equipment normally used during construction.
- .3 Work area:
 - .1 Water tight protection against rain and detrimental weather conditions.
- .4 Temperature:
 - .1 Maintain ambient temperature of not less than 10 degrees Celsius or C° from 7 days before installation to at least 48 hours after completion of Work and maintain relative humidity not higher than 40% during same period.
 - .2 Maintain substrate temperature at 10 C° minimum.
- .5 Moisture:
 - .1 Ensure concrete substrate is within moisture limits prescribed by flooring manufacturer.
- .6 Safety:
 - .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.
- .7 Ventilation:
 - .1 Ventilate area of work as directed by Consultant by use of approved portable supply and exhaust fans.
 - .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
 - .3 Provide continuous ventilation during and after coating application.
 - .4 Sufficient to prevent carbon monoxide or high levels of carbon dioxide and other injurious gases from affecting concrete.

1.7 SCOPE OF WORK

- .1 Provide liquid hardener at all exposed concrete slab-on-grade areas, and where exposed concrete is indicated on architectural drawings or in room finish schedule.

Part 2 Products

2.1 FLOOR HARDENER

- .1 Concrete floor sealer (SCONC): where concrete curing agent/sealer/hardener is required, provide Shur-Seal or Sure Hard manufactured by Dayton Superior's Canada Limited.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine area and conditions under which the work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work and which do not conform to manufacturer's recommendations. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- .1 On freshly poured concrete surfaces, no additional surface preparation will be required. All surfaces must be clean, sound and absorptive. Remove any concrete laitance and patch, fix all cracks and damaged areas. New concrete should be properly cured a minimum of seven (7) days, prior to placing the concrete floor hardener, in accordance with CSA A23.1 by one of the following methods: water, plastic sheeting or burlap.
- .2 On areas where forms are recently removed, remove all form oil and breaking compound residue to assure penetration of the product into the surface.
- .3 When applying near windows, mask the glass.
- .4 Avoid contact with plant life, glass, aluminum, and other finished surfaces. Where contact occurs, immediately wipe with a damp cloth or flush with water.
- .5 Avoid contact with asphaltic concrete.
- .6 On previously sealed existing concrete floors, completely strip floor of sealers and contaminants prior to application. Apply as for freshly poured surfaces.

3.3 APPLICATION REQUIREMENTS

- .1 Two applications are required. The first application at 5m²/litre followed by the second application at 10m²/litre as final coat in strict accordance with manufacturer's specifications.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

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

1.2 WORK IN OTHER SECTIONS

- .1 Related Work Specified in Other Sections

Section 03 10 00	:	Concrete Formwork & Accessories
Section 03 30 00	:	Cast-in-Place Concrete
Section 04 22 00	:	Concrete Unit Masonry
Section 05 10 00	:	Structural Metal Framing

1.3 QUALIFICATION

- .1 The work of this Section shall be carried out by an established concrete pre-casting company having a proven record of satisfactory workmanship for a period of at least 5 years prior to this contract and approved by the Consultant.

1.4 SCOPE OF WORK

- .1 Supply all materials, labour and service to provide acceptable finished precast concrete floors, and precast concrete stairs where indicated on the structural drawings.

1.5 REFERENCE STANDARDS

- .1 Perform work of this Section to meet specified requirements of C.S.A. Standard CSA-A23.1-19, Concrete Materials and Methods of Concrete Construction.
- .2 Additionally perform work of this Section to meet specified requirements of CSA-A23.4, Prestressed Concrete.
- .3 Concrete shall have a minimum compressive strength of 25 MPa at transfer and 40 MPa at 28 days.
- .4 Precast slabs shall be manufactured by an extrusion process using smooth rigid steel forms and cut to length as required on the project.

1.6 SYSTEM DESCRIPTION

- .1 Structural Requirements: Fabricate slabs to support dead loads, and live loads as indicated on Drawings, with maximum deflections of
- : 1/360 of the span for floor slabs.
- : 1/300 of the span for roof slabs.
- .2 Tolerances: Ensure that subfloor surfaces under finish flooring are levelled by filling

compound or other means to within 3.2mm under a 3m long straightedge and within a maximum variation of 1.5mm in any running 300mm.

- .3 Designer Qualifications: Design and supervise fabrication of precast hollow core concrete slabs specified in this Section by professional engineers licensed to practice at the place of building.

1.7 REQUIREMENTS OF REGULATORY AGENCIES

- .1 Fabricate precast hollow core concrete slabs that are validated by ULI, ULC or NRC tests for fire-protection or fire-resistance ratings in complete accordance with the test design specification. Precast hollow core concrete slabs provided otherwise, and which require a fire rating, will be approved only on presentation of affidavits that it is acceptable to the authorities having jurisdiction.

1.8 INSPECTION SERVICES

- .1 Submit affidavits that precast hollow core concrete slabs have been fabricated to meet requirements of the Specifications. Include copies of mill tests of reinforcement incorporated, and compression test results of tests made for each 38 cu.m, or part, of concrete.

1.9 SUBMITTALS

- .1 Design Data: Submit, with shop drawings, calculations pertaining to the design of slabs including reinforcement, anchorage, connections and estimated camber, and in the same manner as for shop drawings.
- .2 Submit shop and erection drawings.
- .3 Include documentation of manufacturing procedures including means of checking strand slippage, concrete strength at time of detensioning, and methods used to determine slippage and concrete strength.
- .4 Affix the seal of the engineer, signed and dated, who is responsible for structural analysis and design of cellular concrete slabs on each shop drawing and supporting document.
- .5 Affidavits: Submit affidavits as specified in this Section for products, if requested.
- .6 Production Reports: Submit test reports of strand slippage with a performance evaluation of each slab.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Handle, transport and store precast hollow core concrete slabs as required by specified reference standards, and by use of methods devised or approved, or both, by fabricator to prevent staining, soiling and damage.
- .2 Store precast hollow core concrete slabs to clear ground or other bearing surfaces, to prevent overstress, warp, twist, accumulation of water and snow in depressions and holes, and to afford free movement of air on all sides of each unit.

1.11 SITE CONDITIONS

- .1 Environmental Requirements: Grout in anchorage and joints, and patch concrete, only when air and surface temperatures exceed 4 deg. C and will remain so until grout has cured.

Part 2 Products

2.1 MATERIALS

- .1 Incorporate materials to meet specified requirements of CSA-A23.4-16, and as required to meet specified performance.
- .2 Reinforcement:
 - .1 Mild Steel Bars: Billet steel to meet specified requirements of CAN/CSA-G30.18-21.
 - .2 Prestressing Tendons: Uncoated, 7 wire strand, high tensile steel to meet specified requirements of CSA G279-1975 (R1998).
- .3 Water: Verify that no salts are present that will cause efflorescence.
- .4 Bearing Pads: 3.2mm thick tempered hardboard, smooth on each side, to meet specified requirements of CGSB Specification 11-GP-3M, Type 2.
- .5 Grout: Cement grout consisting of one part portland cement mixed with 2½ parts sand and sufficient water for placing and hydration.
- .6 Sealant: To suit manufacturer's standards.
- .7 Core Insulation: Rigid polystyrene to meet specified requirements of CGSB 41-GP-14a Type 4.
- .8 Levelling Topping: Shall be cementitious based, minimum 50 mm in thick over the entire floor area (gypsum based products are not acceptable). Racked finishes shall be provided for the precast slabs to facilitate bonding with the required topping.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify, before delivery of materials to site, that construction to receive precast slabs is located correctly and at proper levels.
- .2 Ensure that bearings are clean, smooth and level, and provision has been made for proper anchorage.
- .3 Defective hollow core concrete slab installation caused by unsatisfactory construction previously completed will be considered the responsibility of this Section.

- .4 Ensure that stair slabs are constructed in accordance with the architectural layout.

3.2 PREPARATION

- .1 Take particular care to protect finished surfaces that are exposed to view from mortar droppings and smears.
- .2 Protect visible edges of slabs that are exposed to possible damage.
- .3 Protect slabs from damage from welding by use of non-combustible shielding.

3.3 FABRICATION

- .1 Fabricate slabs:
 - .1 To meet specified requirements of reference standards for fabrication and manufacturer's certification.
 - .2 To ensure that finished dimensions are within specified tolerances.
 - .3 To meet or exceed performance requirements.
 - .4 With concrete consolidated through full cross-section of slabs to provide full bond with reinforcement, and surfaces free of cold joints and honeycombing.
 - .5 With cambers incorporated.
 - .6 To include closure slabs of special widths to suit Project conditions.
 - .7 With surfaces of a uniform appearance where exposed to view, and with no visible seams.
 - .8 With raked finish where topping is to exceed 25 mm.
- .2 Concrete:
 - .1 Of mix designed by fabricator to meet requirements of Specifications.
 - .2 Normal weight, with compressive strength of 40 MPa at 28 days.
- .3 Reinforcement:
 - .1 Cover reinforcement with concrete to a thickness required by jurisdictional authorities to provide fire protection.
 - .2 Minimum strength of concrete at detensioning shall be 25 MPa.
 - .3 Record strand slippage.
- .4 Curing: Cure slabs by normal curing process.
- .5 Finishing: Provide smooth finishes as approved by the Consultant for carpet and vinyl tile

floor finishes and for painting of ceiling.

3.4 INSTALLATION

- .1 Install slabs with uniform joint widths, and units aligned straight, plumb, level and square. Cumulative dimensional error in position of slabs will not be allowed.
- .2 Install bearings and set slabs on them dry.
- .3 Coordinate the location of holes through slabs with consultant drawings, and cut holes through slabs to ensure that no damage is caused to slabs or reinforcement.
- .4 Supply information required for installation of anchors, supports, inserts and similar accessories that are required by this Section and are installed by other Sections. Assist or supervise, or both, in their installation.
- .5 Install and grout in anchorage.
- .6 Drypack completely under the edges of slab (full length) above and between beams, walls, etc.
- .7 Do not grout one cell of the core throughout the length of the slab installation, to provide for installation of electrical, telephone and data services.
- .8 Fill joints and keys between slabs completely with grout. Saturate surfaces of joints and keys with water before grouting.
- .9 Apply skim coat of concrete over each floor area to provide a level smooth substrate for installation of finish flooring within tolerances as per CSA-A23.4 and as specified in Section 03 30 00.
- .10 Do not install chipped, cracked, blemished, stained or otherwise defective units.
- .11 Caulk between abutting slabs and at joints between slabs and adjoining construction to meet specified requirements in applicable sections of this specification.

3.5 ADJUSTMENT AND CLEANING

- .1 Patch holes and damaged surfaces where exposed to view with concrete to match adjacent area. Use bonding agent if required to ensure bond. Finish patches to match precisely the colour and texture of adjacent area. Remove and repatch areas that do not match.
- .2 Co-ordinate location and size of holes with applicable sub-trades. Repair oversized, misaligned and incorrect openings in a manner acceptable to the Consultant.
- .3 Clean surfaces of slabs exposed to view after joint treatment is complete. Use fibre brushes, water and mild cleaning agents only as recommended by precast fabricator. Remove deposits of foreign material, dirt, soil and stains. Do not use tools which will damage finish surfaces. Rinse thoroughly with clean water after cleaning.
- .4 Protect adjoining surfaces from damage during cleaning.

END OF SECTION 03 40 00

Part 1 General

1.1 GENERAL REQUIREMENTS

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

1.2 WORK IN OTHER SECTIONS

- .1 Related Work Specified in Other Sections
- | | | |
|-------------------------|---|------------------------------|
| Section 03 30 00 | : | Cast-in-Place Concrete |
| Section 04 10 00 | : | Mortar & Grout |
| Section 04 22 00 | : | Unit Masonry |
| Section 05 10 00 | : | Structural Metal Framing |
| Section 05 30 00 | : | Metal Decking |
| Section 05 50 00 | : | Metal Fabrications |
| Section 07 84 00 | : | Fire Stopping |
| Section 08 11 14 | : | Steel Doors & Frames |
| Section 09 21 16 | : | Gypsum Board Assemblies |
| Section 09 22 16 | : | Non-Structural Metal Framing |
| Division 21, 22, 23, 25 | : | Mechanical |
| Division 26 | : | Electrical |

1.3 REFERENCE STANDARDS

- .1 Do masonry work in accordance with CAN/CSA A371-14(R2019) except where specified otherwise.
- .2 All masonry work shall be carried out in accordance with CSA-A371-14(R2019) "Masonry Construction for Buildings", CAN3-S304-14(R2019) "Masonry Design for Buildings".

1.4 JOB MOCK-UP

- .1 Construct mock-up panel of exterior masonry wall construction 1200 x 1800 mm showing masonry colours and textures, use of reinforcement, ties, jointing, coursing, mortar and workmanship.

1.5 SOURCE QUALITY

- .1 Submit laboratory test reports certifying compliance of masonry units (and mortar ingredients) with specification requirements, in accordance with Section 01400.

1.6 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00:

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to job site in dry condition. Keep materials dry until use. Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber

skids.

1.8 COLD WEATHER REQUIREMENTS

- .1 Supplement Clause 5.15.2 of CSA-A371-14 with following requirements:
 - .1 Maintain temperature of mortar between 5°C and 50°C until used.

1.9 HOT WEATHER REQUIREMENTS

- .1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

1.10 PROTECTION

- .1 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.
- .2 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .3 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

Part 2 Products

2.1 MATERIALS

- .1 Masonry materials are specified in Section 04 22 00.
- .2 Mortar and grout: as specified in Section 04 10 00.

Part 3 Execution

3.1 WORKMANSHIP

- .1 Build masonry plumb, level, and true to line, with vertical joints in alignment.
- .2 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.
- .3 Place grout as required to maintain an adequate level of structural bearing surface with no voids and to a depth as shown on drawings.
- .4 Ensure that cores of acoustic block remain free of all mortar to maintain sound transmission requirements.

3.2 TOLERANCES

- .1 Tolerances in notes to Clause 5.3 of CSA-A371-14 apply.

3.3 EXPOSED MASONRY

- .1 All corners of exposed concrete unit masonry on interior of the building shall be bullnosed including at door frames, windows, louvres, etc.
- .2 Remove chipped, cracked, and otherwise damaged units in exposed masonry and replace with undamaged units.

3.4 JOINTING

- .1 Allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, compressed, uniformly concave joints for all exposed joints.
- .2 Strike flush all joints concealed in walls and joints in walls to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating.

3.5 CUTTING

- .1 Cut out neatly for electrical switches, outlet boxes, and other recessed or built-in objects.
- .2 Make cuts straight, clean and free from uneven edges.
- .3 Masonry which has been broken as a result of installing switches, boxes, piping, etc., is to be removed and rebuilt as directed by the Consultant.

3.6 BUILDING-IN

- .1 Build in items required to be built into masonry.
- .2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
- .3 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.

3.7 SUPPORT OF LOADS

- .1 Use 25 MPa concrete to where concrete fill is used in lieu of solid units.
- .2 Use grout to CSA A179-14 where grout is used in lieu of solid units.
- .3 Install building paper below voids to be filled with concrete or grout; keep paper 25 mm back from faces of units.

3.8 PROVISION FOR MOVEMENT

- .1 Leave a minimum 10 mm (3/8") space between walls and structural elements vertical and minimum 12 mm (1/2)" below steel beams horizontal. Fill space with compressible material and caulk both sides. Do not use wedges.

3.9 CONTROL JOINTS

- .1 Provide continuous caulked control joints as indicated. Joints to have backing and be caulked interior and exterior surfaces of the wall system to ensure water tightness.
- .2 Provide continuous caulked control joints (at columns) and at max. 6000mm centres. Joints to have backing and be caulked both sides of the wall system.

3.10 TESTING

- .1 Inspection and testing will be carried out by Testing Laboratory designated by the Consultant.
- .2 Cost of testing will be paid by the Owner.

END OF SECTION 04 05 00

Part 1 General

1.1 GENERAL REQUIREMENTS

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

1.2 WORK IN OTHER SECTIONS

- .1 Related Work Specified in Other Sections
- | | | |
|-------------------------|---|------------------------------|
| Section 03 30 00 | : | Cast-in-Place Concrete |
| Section 04 05 00 | : | Masonry Procedures |
| Section 04 20 00 | : | Unit Masonry |
| Section 05 10 00 | : | Structural Metal Framing |
| Section 05 30 00 | : | Metal Decking |
| Section 05 50 00 | : | Metal Fabrications |
| Section 06 10 11 | : | Rough Carpentry |
| Section 07 21 13 | : | Board Insulation |
| Section 07 21 19 | : | Foamed-in-Place Insulation |
| Section 08 11 14 | : | Steel Doors & Frames |
| Section 09 21 16 | : | Gypsum Board Assemblies |
| Section 09 22 16 | : | Non-Structural Metal Framing |
| Section 09 91 22 | : | Painting |
| Section 14 21 23 | : | Hydraulic Passenger Elevator |
| Division 21, 22, 23, 25 | : | Mechanical |
| Division 26 | : | Electrical |

REFERENCE STANDARD

- .1 Do masonry mortar and grout work in accordance with CSA A179-14 (R2019) and CSA-A82.56-94 except where specified otherwise.
- .2 All masonry mortar and grout work shall be carried out in accordance with CSA A179-14 (R2019) mortar and grout for unit masonry and CSA A82.56-94 aggregate for masonry mortar.

CSA A371-14 (R2019): Masonry Construction for Buildings.

CSA S304-14 (R2019): Masonry Design for Buildings (Limit States Design).

CAN/CSA A179-14 (R2019): Mortar and Grout for Unit Masonry

1.2 QUALIFICATIONS

- .1 Execute work of this section only by a Contractor who has adequate equipment and skilled tradesmen to perform it expeditiously and is known to have been responsible for satisfactory installations similar to that specified during a period of at least five (5) years.

1.3 SUBMITTALS

- .1 Submit affidavit from an inspection company that all materials conform to the

requirements of the specification.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Store all materials protected against moisture, freezing and excess heat and to prevent contamination by foreign materials.

Part 2 Products

2.1 MATERIALS

- .1 General: Ensure that water and aggregates used are all from same source and will meet required strengths. Batch mortar and grouts are acceptable provided source is approved prior to commencement of work.
- .2 Mortar and grout: Types M, N, S and O to CSA A179-94
- .3 Colour: To match brick used. As manufactured by Harcross Pigments.
- .4 Masonry Cement – CAN/CSA-A8, Type H.
 - .1 Portland Cement – CAN/CSA-A3001, Normal
 - .2 Hydrated Lime - CSA A82.43.
 - .3 Sand Aggregate CSA A82.56.
 - .4 Water - Verify that water used contains no salts to cause efflorescence.
 - .5 Mortar - Shall be grey dirt resistant and conform to the following:-

Loadbearing	:	Type S and M
Non-Loadbearing	:	Type N and S
- .5 Dirt resistant additives: aluminum tristearate, calcium stearate or ammonium stearate.
- .6 Use aggregate passing 1.18 mm sieve where 6 mm thick joints are indicated.

2.2 MATERIAL SOURCE

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

2.3 MORTAR TYPES

- .1 Mortar for exterior masonry:
 - .1 Loadbearing: Type S and M.
 - .2 Non-loadbearing: Type N and S.

2.4 DIRT-RESISTANT MORTAR

- .1 For dirt-resistant mortar add aluminum tristearate, calcium stearate, or ammonium stearate to mortar in amount of 3% of weight of Portland cement.
- .2 Use dirt-resistant mortar for all masonry work for the project.

2.5 GROUT

- .1 Non-shrink Grout: to CSA A179-14 Table 3 by Embeco by Master Builders, In-Pakt by C.C. Chemicals, or M-Bed Superflow by Sternson.
- .2 Concrete grout for reinforced masonry shall consist of one part Portland cement and three parts sand with water to provide a minimum compressive strength of 20MPa at 28 days. Maximum aggregate size shall be 10mm. Slump for the grout shall be 200 to 250mm.

Part 3 Execution

3.1 MIXING

- .1 Mix mortar to consistency required for working.
- .2 Mix grout to semi-fluid consistency.
- .3 Incorporate colour and admixtures into mixes in accordance with manufacturer's instructions. Use clean mixer for coloured mortar.
- .4 Pre-hydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour nor more than 2 hour then remix with sufficient water to produce mortar of proper consistency for pointing.

3.2 INSTALLATION

- .1 Grout fully all pockets in concrete foundation walls where structural components installed, under bearing plates at piers and elsewhere as noted on drawings.
- .2 Grout solid all reinforcing installed in concrete block walls.
- .3 Protect all mortar and grout installed from freezing or from excessive heat which will prevent bonding or decrease the required compressive strength.

END OF SECTION 04 10 00

Part 1 General

1.1 RELATED SECTIONS

- .1 This section to be read in conjunction with Section 04 22 00 for Execution Requirements
- .2 Section 01 33 00 – Submittal Procedures
- .3 Section 03 30 00 – Cast-in-Place Concrete
- .4 Section 05 12 23 – Structural Steel for Buildings
- .5 Section 03 41 00 – Plant- Precast Structural Concrete
- .6 Section 04 22 00 – Concrete Unit Masonry
- .7 Section 07 21 13 – Board Insulation

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM).
 - .1 ASTM C126-99, Standard Specification for Precast Concrete units Tile, Facing Brick, and Solid Masonry Units.
- .2 Brick Industry Association (BIA).
 - .1 Technical Note No. 20, Cleaning Brick Masonry.
- .3 Canadian Standards Association (CSA International).
 - .1 CAN/CSA A82-06: Fired Masonry Brick Made from Clay or Shale
 - .2 CAN/CSA-A165 SERIES-04 (R2009): Concrete Block Masonry Units
 - .3 CSA-A371-04 (R2009): Masonry Construction for Buildings
 - .4 CAN/CSA-A3001: Portland Cement
 - .5 CSA-A8-M88: Masonry Cement
 - .6 CSA S304.1-04: Design of Masonry Structures

1.3 SUBMITTALS

- .1 Product Data.
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's Instructions.
 - .1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 For clay units, in addition to requirements set out in referenced CSA and ASTM Standards include data indicating initial rate of absorption for units proposed for use.

1.5 PRODUCT DELIVERY STORAGE AND HANDLING

- .1 Ensure that materials are delivered to job site in dry condition.
- .2 Except where wetting of units is specified, keep materials dry until use.
- .3 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

1.6 COLD WEATHER REQUIREMENTS

- .1 Supplement Clause 5.15.2 of CSA A371 with the following
 - .1 Maintain temperature of mortar between 5°C and 50°C until used.

1.7 HOT WEATHER REQUIREMENTS

- .1 As per Clause 6.7.4 of CSA A37.

1.8 PROTECTION

- .1 Until completed and protected by flashings or other permanent construction, keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain. Use waterproof coverings draped 600 mm (min.) down each side of wall and securely anchored.
- .2 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .3 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

1.9 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.

1.10 JOB MOCK UP

- .1 Construct mock-up panel of exterior masonry wall construction, 2000 mm x 2000 mm, showing all masonry materials and colors, fixtures, jointing, coursing, mortar and workmanship.

Part 2 Products

2.1 MANUFACTURED UNITS

- .1 Concrete Masonry Veneer Units:
 - .1 All units: **90 mm x 90 mm x 390 mm (HxDxL)** in a smooth finish as manufactured by:
 - .1 Brampton Brick, Brampton, ON, tel. (800) 462-7425.
 - .2 Day & Campbell, Hamilton, ON, tel.: (905) 385-5315
 - .3 Richvale York Block Inc., Toronto, tel (877) 792-5625
 - .2 **Masonry Veneer (Colour - Light Grey-White):**
 - .1 Brampton Brick 'Finesse Series – Colour POLAR WHITE (*Suave*)
 - .2 Day & Campbell 'Modern Masonry Architectural' – Colour CAMEO WHITE #200 (*Honed*)
 - .3 Richvale York 'Cambridge Series' – Colour WELLINGTON (*Ground*)
 - .3 All units are to be manufactured from single continuous run to ensure minimum colour and texture variations.
 - .4 Provide solid units where required for corners and edges.
- .2 Pre-cast Concrete Sills (Colour – Natural Grey):
 - .1 All units: 90 mm x 140 mm x 5380 mm (HxDxL) and 90 mm x 140 mm x 1800 mm (HxDxL) as illustrated on drawings and manufactured by:
 - .1 Brampton Brick, Brampton, ON, tel. (800) 462-7425.
 - .2 Day & Campbell, Hamilton, ON, tel.: (905) 385-5315
 - .3 Richvale York Block Inc., Toronto, tel (877) 792-5625
 - .2 Locations: at all locations shown on drawings.
- .2 Portland Cement:
 - .1 To CAN/CSA-A3001.
- .3 Masonry Cement:
 - .1 To CAN/CSA A8.
- .4 Hydrated Lime:
 - .1 To ASTM C207-74.
- .5 Aggregate:
 - .1 To CSA A82.56-M1976.
- .6 Water:
 - .1 Ensure that water contains no salts which may cause efflorescence.
- .7 Thru-wall Flashing and Air/Vapour Barrier Sheet Membrane Treatment: Self-adhering SBS modified bitumen membrane reinforced with non-woven fibrous glass. Acceptable materials: Blueskin TW by Bakor Inc., Mississauga or sheet air/vapour barrier membrane as specified as in Section 07 27 10 – Air Barriers.
- .8 Bolts and Anchors: To CAN3-A370.

- .9 Natural Mortar:
 - .1 Generally: Use materials only as specified in CSA A179. Ensure that weather and aggregate used in mortar, other than in walls buried in earth, will not cause efflorescence.
 - .2 Bonding Agent: Acrylic latex type by Sternson Limited, W.R. Meadows or Thoro Building Products. Use for all mortar except clay brick.
 - .3 Mixes: Mix mortars as specified in CSA A179 using the Proportion Specification. Add bonding agent in accordance with manufacturer's instructions.
 - .4 Mortar Types:
 - .1 For masonry walls in contact with earth and bedding for bearing plates and lintels: Mortar Type "S".
 - .2 For load-bearing walls: Mortar Type "S".
 - .3 For clay brick: Mortar Type "N" (1:1:6) premixed "Betomix 1-1-6" Type "S" portland cement hydrated lime as supplied by Daubois Inc., Jiffy Mortar Systems. Mix on site with sand and water.
 - .4 For all other (non-structural) masonry walls, use regular Type "N" mortar.
 - .5 Grout: To CSA A179 Table 3.
- .10 Mortar Dropping Control Device: "Mortar Net" manufactured by Mortar Net USA (Telephone: 1-800-664-6638).
- .11 Weepholes: 90 mm x 90 mm x 10 mm purpose made PVC, designed to drain cavities and with mesh to prevent insects from entering. Colour to be chosen by Architect from manufacturer's full range.
- .12 Date Stone: Date stone to be 390 x 390 x 90 deep solid limestone. Font: Technic Lite, 100mm high. Beveled edges. Polish finish. Location to be determined by Architect.
- .13 Veneer Ties: Fero slotted block tie (Type II) c/w V-Tie manufactured from 4.76 mm diameter wire conforming to CSA Standard G30.3, hot dipped galvanized to ASTM A153.
- .14 Pre-Cast Concrete Sills (Colour – Natural Grey):
 - .1 All units: nominal 90 mm x 140 mm x 600 mm (HxDxL) as illustrated on drawings and manufactured by:
 - .1 Brampton Brick, Brampton, ON, tel. (800) 462-7425.
 - .2 Day & Campbell, Hamilton, ON, tel.: (905) 385-5315
 - .3 Richvale York Block Inc., Toronto, tel (877) 792-5625
 - .4 Permacon, Mississauga, ON, tel: (888)-737-6226.
 - .2 Locations: between masonry veneer and metal siding as shown on drawings".

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 WORKMANSHIP

- .1 Build masonry plumb, level, and true to line, with joints in proper alignment.
- .2 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.3 TOLERANCES

- .1 Clause 5.3 of CAN/CSA-A371 applies except as follows: Walls to receive thinset ceramic tile: plumb within 1:600.

3.4 EXPOSED MASONRY

- .1 Remove chipped, cracked, and otherwise damaged units in exposed masonry and replace with undamaged units.
- .2 Parging on the face of exposed masonry units will be rejected.

3.5 JOINTING

- .1 Except where indicated otherwise on drawings or details or as below, make concave joints, allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, compressed, uniformly concave joints. Where joints are to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating, strike flush.

3.6 WEEPHOLES

- .1 Provide 10 x 90 x 90 mm PVC weepers at regular intervals at both top and bottom of walls as indicated on Drawings. Ensure weepers are clear and not blocked by mortar or mortar droppings.

3.7 JOINING OF WORK

- .1 Where necessary to temporarily stop horizontal runs of masonry, and in building corner, Step-back masonry diagonally to lowest course previously laid. Do not "tooth" new masonry. Fill in adjacent course before heights of stepped masonry reach 1200 mm.

3.8 CUTTING

- .1 Cut out neatly for electrical switches, outlet boxes, and other recessed or built-in objects.
- .2 Make cuts straight, clean, and free from uneven edges. Use masonry saw where necessary.

3.9 BUILDING-IN

- .1 Build in items required to be built into masonry by other trades.
- .2 Prevent displacement of built-in items during construction. Check for plumbness, alignment, and correctness of position, as work progresses.
- .3 Brace door jambs to maintain plumbness. Fill door frame with concrete.

3.10 WETTING OF UNITS

- .1 Except during winter, wet units having an initial rate of absorption exceeding 1g/min/100mm²; wet to uniform degree of saturation, to 24 hours before laying, and do not lay until surface is dry.
- .2 Similarly, wet tops of walls built of units qualifying for wetting, when recommencing work on such walls.

3.11 SUPPORT OF LOADS

- .1 Except where drawing requirements are more stringent, comply with Clause 6.3 of CSA S304.1.
- .2 Where concrete fill is used in lieu of solid units, use minimum 25 MPa concrete to Section 03 30 00.
- .3 Install building paper below voids to be filled with concrete; keep paper 25 mm back from faces of units.

3.12 PROVISION FOR MOVEMENT

- .1 Leave 5 mm space below shelf angles.
- .2 Leave 6 mm space and do not use wedges between tops of non-load bearing walls and partitions and structural elements.

3.13 LINTELS

- .1 Install steel lintels above windows, doors and all mechanical and electrical as shown on structural drawings. Centre over opening width.
- .2 Install loose steel lintels supplied by Section 05 12 23. Centre lintel over opening width. Minimum 150 mm solid bearing each end.
- .3 Lintels over 2000 mm span to be complete with bearing plate and anchors each end.
- .4 Bridge openings less than 450 mm wide with 6 mm thick mild steel plate lintels, bearing minimum 100 mm on each side of opening and set on dry pack grout. Width of plate to be equal to the wall thickness less 25 mm.
- .5 Install precast concrete lintels supplied under Section 03 30 00.

3.14 CONTROL AND EXPANSION JOINTS

- .1 Except as noted following, control joints required at maximum of 6000 mm o.c. in continuous walls having no openings, intersections or column locations. Refer to elevations for locations on exterior walls and advise Consultant of variances prior to executing the work. Control joints are not shown for clarity on the drawings for interior walls. If in doubt, request assistance from the Consultant.
- .2 At doorway locations, unless indicated otherwise on elevation drawings, use one side of doorway beyond lintel. Use building paper to prevent that end of lintel to bond.
- .3 Use standard block with concrete filled end core to form key. Line one side of core with building paper before filling core to prevent bonding. Complete vertical separation, full height and thickness of wall are required.
- .4 Stop masonry reinforcing at each side of the joints. Caulking specified in Section 07 92 10 – Joint Sealers.
- .5 At expansion joints in brick and veneer, install Rapid Expansion joint DA 2015, to leave vertical joint free of mortar to allow for horizontal expansion.

3.15 INSPECTION & TESTING

- .1 Refer to Section 01 11 00 – Summary of Work, section 1.29.

3.16 CLEANING

- .1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .2 On a weekly basis and at completion of work remove all debris, cut blocks and bricks, and mortar droppings.
- .3 Power wash or brush exterior masonry surfaces at completion of work.
 - .1 Soft, clean cloths.
- .4 Clean concrete brick masonry as work progresses.
 - .1 Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of veneer and finally by brushing.
- .5 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

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

1.2 WORK IN OTHER SECTIONS

- .1 Related Work Specified in Other Sections

Section 03 30 00	:	Cast-in-Place Concrete
Section 04 05 00	:	Masonry Procedures
Section 04 10 00	:	Mortar & Grout
Section 05 10 00	:	Structural Metal Framing
Section 05 50 00	:	Metal Fabrications
Section 07 62 00	:	Sheet Metal Flashing & Trim
Section 07 92 00	:	Joint Sealers
Section 08 11 14	:	Steel Doors and Frames
Section 08 50 50	:	Aluminum Windows

- .2 Products Supplied Under Work of Other Sections
and Installed Under Work of This Sections

Section 07 21 13	:	Board Insulation
Section 08 11 14	:	Steel Doors & Frames

1.3 QUALIFICATIONS

- .1 Execute work of this section only by a contractor who has adequate equipment and skilled tradesmen to perform it expeditiously and is known to have been responsible for satisfactory installations similar to that specified during a period of at least five years.

1.4 REFERENCE STANDARDS

CSA A3000-23 – Cementitious Materials Compendium
CAN/CSA-A165 SERIES-04 (R2014) - Concrete Block Masonry Units
CAN/CSA A82-14, ASTM C216-24 – Fired Masonry Brick Made from Clay or Shale
CSA A371-14 – Masonry Construction for Buildings
CSA S304.14 – Design of Masonry Structures
CSA-A23.1-14 - Concrete Materials and Methods of Concrete Construction

- .1 Install flashings in masonry as follows:
.1 Install flashings under exterior masonry bearing on foundation wall.

1.5 SUPERVISION

- .1 Work of this Section shall be executed under the continuous supervision and direction of a competent foreman for each class of work.
- .2 One thoroughly experienced, reliable and competent tradesman shall be in charge of mortar mixing.
- .3 Ensure that all items required to be built into masonry walls by all other trades are known and co-ordinated prior to commencement of work.
- .4 Consult the approved shop drawings for all sections of the specifications to determine the exact location of items to be built into masonry.

1.6 SUBMITTALS

- .1 Submit for approval clearly labelled samples of masonry materials to be used in the work. Submit for approval any alternative materials if requested by the Consultant.
- .2 Provide a mock-up sample, 1200mm HIGH by 1800mm LONG, for each of the following items, prior to commencing work:-
 - : exterior brick
 - : interior brick

1.7 DEFECTS DEFINED

- .1 In addition to non-compliance with specified requirements or other contract requirements, the following will be considered defect:
 - .1 Shrinkage in individual units and erected walls.
 - .2 Spalling, efflorescence, cracking or chipping of units.
 - .3 Poor colour or texture blending of units.
 - .4 Surface deterioration dusting.
 - .5 Discolouration, crumbling and similar deterioration of mortar, grout.
 - .6 Failure of built in items to remain anchored.

1.8 STORAGE OF MATERIALS

- .1 Store cementitious material in accordance with CAN/CSA-A5/A8/A362. Store aggregates in accordance with CSA-A23.1. Stack masonry units to avoid chipping. Manufacturer's seals and labels shall be intact. Refer to cold weather protection Article 3.6 for requirements of preheating masonry materials prior to building in.

1.9 WIND BRACING

- .1 Brace walls during construction until the structure provides sufficient lateral support. **This is a mandatory requirement.**

1.10 PROTECTION

- .1 Cover top of completed and partially completed masonry walls not protected by permanent work. Use waterproof coverings draped 600 mm (min.) down each side of wall and securely anchored.

Part 2 Products

2.1 MATERIALS

- .1 General: Use only materials specified herein.
- .2 Masonry Cement: As specified in Section 04 10 00.
- .3 Portland Cement: As specified in Section 04 10 00.
- .4 Hydrated Lime: As specified in Section 04 10 00.
- .5 Sand aggregate CSA A82.56: As specified in Section 04 10 00.
- .6 Water: Verify that water used contains no salts to cause efflorescence.
- .7 Concrete Masonry Units:
 - .1 Bubble cured units or Autoclaved units to meet requirements of CSA-A165 Series 14.
 - .2 Type H/15 A/M normal weight block.
 - .3 Size Metric
 - .4 Special Shapes - Supply corner block, "L" shape block, bullnose block, header block, lintel block and the like as shown on the drawings, or as required.
- .8 Acoustical Concrete Masonry Units to CSA-A165-14, purpose made with slots to provide the acoustical characteristics specified:
 - .1 Acoustical concrete blocks (Gym): CSA A165 Series, 'Acoustade' by Richvale York Block Inc. Type, size, and extent as shown on drawings, and approved by Consultant.
 - .2 Reinforcing patterns as shown on the structural drawings.
 - .3 Type H/15.0 A/M normal weight block.
 - .4 Incombustible fibrous cavity filler.
- .9 Glass Fibre Board: Glass fibre insulation, semi-rigid board, density of 20.8 kg/m³ (1.3 lbs./cu.ft.).
- .10 Bellows for Control and Expansion Joint: Bituminous membrane type compatible with wall membrane.
- .11 Dampproof/Thru-Wall Flashing: Fibre reinforced membrane, coated one side with 0.61 kg/m² (2 oz./sq.ft.) copper, to meet quality standard of Copper-Bar by Gummed Papers Limited or Bituminous reinforced membrane manufactured by Monsey Bakor Inc.
- .12 Asphalt Emulsions: As specified in CGSB 37-GP-2M.

- .13 Air Barrier Membrane: As specified in Section 07 27 10.
- .14 Brick Vents: Flexible PVC offset "T" shape with vertical leg slotted to allow passage of air, for installation in vertical joints, to meet quality standard of GOODCO brick vent.
- .15 Wall Reinforcing: As shown on Structural drawings.
- .16 Cavity Wallbonding Box Tie: 4.76mm (3/16") galvanized high tensile steel wire, truss type reinforcing with box ties @ 400 o/c in two sections to form a hook and eye, Blok-Lok Limited or equivalent by Dur-O-Wal Limited.
- .17 Flexible Anchor: To suit conditions and to allow for differential movement between the structure and masonry work. Typically: 4.76 mm (3/16") diameter steel, galvanized, bent into an equilateral triangular shape with its apex flexibly secured to structure, and with its two legs terminating in 25 mm (1") inward bent hooks extending a minimum of 100 mm (4") into masonry anchored.
- .18 Wall Ties: 22 gauge galvanized corrugated steel.
- .19 Stud Anchors: 14 gauge, hot-dipped galvanized steel plate anchors with 4.76mm (3/16") diameter galvanized steel wire ties for cavity wall.
- .20 Bond Anchor: 4.76 mm (3/16") diameter steel galvanized with 50 mm (2") end bent 90°.
- .21 Galvanizing: To specified requirements of ASTM Specification A153, Class B.3 coatings, for all bolts and hardware, ASTM Specification A116, Class 3 coating, for masonry ties other than above.
- .22 Cleaner: Vanatrol as manufactured by C.P.D., Ratio 6:1 unless otherwise noted by brick/mortar/grout manufacturer. (MURIATIC ACID NOT ACCEPTED).

Part 3 Execution

3.1 GENERAL WORKMANSHIP

- .1 Employ properly qualified masons for laying up masonry units.
- .2 Distribute exposed masonry units of varying colours, tones and textures evenly over wall surface to avoid patches and streaks and to produce a pleasing appearance.
- .3 Gaining to meet spandrels, etc., leaving courses uneven or with visibly thicker mortar joints will not be acceptable. Any such work must be removed and rebuilt to approval of Consultant.
- .4 Construct masonry evenly in maximum lifts of 1200 mm per working day. Rake back ends of unfinished walls; do not tooth and bond new masonry.
- .5 Chases, fixtures, outlets must be built - not cut. Co-ordinate with Mechanical and Electrical.

- .6 Install aluminium and hollow metal door frames by building in lugs and filling voids with mortar. Keep frames free of mortar stains. Protect as required.
- .7 Chipped or blemished units may be used where concealed. Chipped, cracked or broken units are considered deficiencies where exposed to file and shall be removed and replaced.
- .8 Build masonry with accurately plumbed faces, truly horizontal bed joints and accurately aligned vertical joints.
- .9 Notwithstanding current trade practices in this regard, fill all vertical collar and bed joints through the entire wall thickness solidly with mortar.
- .10 Cut masonry neatly with a carborundum saw where it comes in contact with the structure and where else required and build tightly against the structure except where expansion control and deflection joints are required. Build masonry up and neatly fit to all openings, and all anchors for frames for such openings shall be built securely into joints.
- .11 Do all cutting, fitting and patching in masonry work to receive work of other trades. Install items supplied by other trades to be built into masonry walls, plumb, level, rigid and secure. Build in all miscellaneous metal work, loose lintels, bearing plates, sleeves, anchor bolts, wood nailer and all other items which require building into the masonry. Set access doors with front face flush with final wall finish. Locate such fittings precisely as directed.

3.2 LINTELS

- .1 Set loose lintels supplied under Section 05 10 00 for bridging openings in masonry.
- .2 Bridge openings not exceeding 450 mm in width with 6 mm mild steel plate lintels bearing 100 mm on each side of opening. Width of plate shall be wall thickness less 25 mm. Joint at lintel to be dry packed. Provide minimum brick vents per lintel at 800 o/c.
- .3 Install concrete block lintels where indicated on drawings. Fill with 25 MPa concrete and reinforce as shown. Temporarily support until concrete is cured.

3.3 STRUCTURAL BEARING

- .1 Install bearing pads in all load bearing walls to receive structural components by:
 - : Two courses of solid masonry units at least 400mm (16") in upper course and 800mm (32") long in lower course or by lintel blocks at least 800mm (32") long filled with 25MPa (3600 psi) concrete and reinforced with two 20M diameter bars, in bearing course only.
 - : Co-ordinate this work with fixing devices provided under the work of Section 05 10 00.

3.4 DAMPPROOF COURSE/THRU-WALL FLASHINGS

- .1 Install bituminous membrane on walls and partitions rising from footings below grade and in locations indicated on Drawings. Lap and seal all joints. Install thru-wall flashings at all lintels, grade junctions and roof junctions and in locations indicated on the drawings. Lap and seal all joints.

3.5 CONTROL JOINTS

- .1 Control joints shall be located at maximum spacings of 4800 to 6000 centres and be located as shown on the drawings.

3.6 COLD WEATHER PROTECTION

- .1 Refer to the Ontario Masonry Contractor's Association's provision and publications. Include for tarped heated enclosures, heated mortar mixing pans - no non-freeze additives such as calcium will be tolerated on this project.

3.7 BONDING

- .1 Lay face brick and concrete block units coursing in running bond pattern. Lay soldier and header coursing. Corbel brick piers and friezes as shown on drawings.
- .2 Lay brick coursing to course every second block course. Course soldier coursing to course on three stretcher courses.
- .3 Construct quoins, header courses and soldier and corbelling to protrude 25mm.
- .4 Lay stone in random pattern. Dry pack solid all stone.
- .5 Cut brick to provide opening dimensions shown only as necessary. Cut ends are not to be exposed.
- .6 Anchor brick to back-up at 400 o/c vertical and horizontal maximum with ties.

3.8 JOINTS

- .1 Ensure cavity width is maintained and keep free of droppings. Back trowel to prevent build-up of mortar.
- .2 Rake brick joints to size and depth in accordance with recommended trade practices.
- .3 Keep control joints, expansion joints and air spaces free from mortar and droppings.
- .4 Construct Control Joints in locations shown. **DO NOT SAW CUT.** Sealing to be carried out in conformance with Section 07 92 10. Install bellows to maintain membrane air barrier integrity. Keep joints free of mortar droppings.
- .5 Make joints of uniform thickness with vertical joints plumbed over each other. Do not butter corners of units, allow mortar scrapings in joints excessively or shift and tap units after mortar has initially set.
- .6 For solid masonry units completely fill with mortar both bed and vertical joints.
- .7 For hollow masonry units ensure that mortar covers all available bearing surfaces fully and fills vertical joints, except for weep and vent holes.

- .8 When work is resumed on walls previously laid with mortar either partially or totally set, remove loose masonry and mortar from top and adjoining surfaces. Remove mortar completely when masonry is removed and replaced with new.
- .9 Form tooled concave joints for concrete block walls wherever exposed to view, whether behind cabinets, fitments, and wall accessories, or not. When mortar has become "thumbprint" hard by a tool having a minimum 500mm long bearing surface to avoid uneven depressions. Clean off burrs with trowel or burlap.
- .10 Rake out joints at juncture of interior and exterior walls with columns, at intersections of walls and partitions where joint reinforcement is installed, and at other caulked joints.
- .11 Form reglets required for metal flashing in masonry.
- .12 Flush-in solidly with mortar between cavity filler strips and interior face of brick veneer.
- .13 Cut joints off flush where treatment is not otherwise specified. No mortar shall protrude from joints on wall surfaces to which insulation will be applied.
- .14 Install insulation using adhesive recommended by the manufacturer. Insulation is to be tight fitting with no joints.

3.9 LAYING MASONRY

- .1 Stop off horizontal runs of walls by racking back a half unit in each horizontal course: do not tooth.
- .2 Wet clay and shale masonry units before placing. Do not wet concrete units. Wet faces of work in place before laying new work. Units shall not have water adhering to their surfaces when laid; but shall be wet only to ensure that complete hydration takes place, during hot drying weather, and when unit absorption rates are greater than 0.025 oz/sq.in./ minute, so that the initial rate of absorption does not exceed above rate when laid.
- .3 Distribute masonry units of varying colours and textures to avoid spotty appearance over wall surfaces exposed to review. Do not use units which contrast too greatly with overall range.
- .4 Use chipped and blemished units only where concealed. Do not use defective or broken units. Do not lay concrete units that will appear smooth or slick where exposed to view, whether painted or not.
- .5 Brace walls and piers continuously during construction until structure provides support.
- .6 Extend all walls to construction above except where otherwise noted on Drawings. Leave deflection space over non-load bearing walls as specified later.
- .7 Cope, cut and split concrete masonry units with power-driven abrasive discs. Cut units wherever electrical outlets, grilles, and pipes occur. Allow 4 mm minimum clearance around items which are incorporated in walls.
- .8 Lay hollow concrete masonry units so that effective shells rest and align one over the

other. If they do not in bond courses, use solid bonding units.

- .9 Install solid masonry units at all locations required for fixing of handrails, metal partitions and accessories of all description.
- .10 Flush smooth with mortar masonry surfaces that flashings rest against to ensure that they are not punctured.
- .11 Install brick vents at 600 mm (24") o.c. in vertical joints of masonry courses that rest on dampproofing and thruwall flashing and at top of masonry wall at steel lintels.
- .12 Locate bearings and piers as indicated on Drawings; provide solid masonry units at bearings. Grout under bearing plates installed on masonry with non-shrink grout.
- .13 Co-operate at all times with persons carrying out the work of Section 07 21 13, Board Insulation.
- .14 Keep cavity spaces free of mortar in cavity walls.
- .15 Build, do not cut, chases. Do not incorporate chases in walls of 200mm (8") thick or less, nor locate them within 500mm (20") of lateral support provided for wall, nor exceed one-third of wall thickness for chase depth. Provide lintels over chases that exceed 500mm (20") in width and that are more than one-third of wall thickness in depth. Locate adjoining chases with a minimum clear distance between them of four times wall thickness.

3.10 MASONRY REINFORCING

- .1 Reinforce all masonry walls using joint reinforcement in horizontal joints.
- .2 Place joint reinforcement continuously in horizontal joints. Lap a minimum of 150mm (6") at splices.
- .3 Reinforcing Schedule
 - : Inner Wythe of Cavity Walls (Non Load Bearing): Heavy duty joint reinforcement every second course between bonding ties.
 - : Load-Bearing Exterior and Interior Walls: Heavy duty joint reinforcement every block course.
 - : Non-Load-Bearing Partitions: Standard joint reinforcement every second course with additional course over all openings carried at least 800 mm (32") beyond jambs.
 - : Refer to Structural Drawings for size and placement of vertical reinforcing steel.
- .4 Do not reinforce face veneers.
- .5 Where changes in wall thicknesses occur extend horizontal reinforcement 500 mm (20") beyond on each side. Carry reinforcement all around every course in masonry cover to structural steel.
- .6 Do not carry reinforcement through control or expansion joints.

- .7 Wherever walls and partitions intersect one another, or each other, continue reinforcement through. Do not carry it through where lateral support anchors are installed, or intersection occurs at a solid pier.

3.11 MASONRY ANCHORAGE AND SUPPORT

- .1 Anchor masonry construction to ensure its stability and to withstand loads imposed by intended use and by natural elements.
- .2 Anchor masonry construction at structural steel work with flexible anchor every 400mm (16") in height. Weld flexible tab section of anchor to structural steel.
- .3 Unless indicated or specified otherwise, space anchors at a maximum of 600mm (24") vertically and 800mm (32") horizontally.
- .4 Wall Anchorage:
- : For Non-Load-Bearing Partitions: Anchor partitions that abut or intersect other walls or partitions by corrugated galvanized wall ties spaced at not more than every third course apart vertically or by joint reinforcement.
 - : For Load-Bearing Exterior and Interior Walls: Anchor walls that face or abut other load-bearing walls or solid masonry piers by toothing, or blocking, with 100 mm (4") minimum and 200 mm (8") maximum offsets into which strap anchors are set at a maximum spacing of 800 mm (32") vertically. Use lateral support anchors, but with 75 mm (3") hooks. Extend anchors a minimum of 450 mm (18") into masonry at both sides of intersection. Where this is not possible, install cross pins in lieu of hooks to provide equivalent anchorage. At corners, provide true bonding of at least 50% of the units of one wall imbedded in the other. Provide for caulked joints at intersecting walls as part of the work of Section 07 92 10 Joint Sealing.
- .5 Lateral Support: shall be provided for masonry walls and partitions as indicated on Drawings, specified, and required by jurisdictional authorities; perpendicular to wall faces; and either horizontally or vertically to wall panel edges. Provide lateral support for interior walls and partitions.
- : Horizontally: by wedging masonry against structure, by clips or dowel plates specified in Section 05 50 00, Metal Fabrications, at a maximum spacing of 1800mm (6'-0") o.c. where concealed in the final work or by continuous cover angles where exposed.
 - : Vertically: at junction with poured-in-place concrete by corrugated metal veneer anchors spaced at not more than every third course apart, one for every 4" or part thereof of masonry wall thickness, securely fastened to concrete by an approved method.
- .6 Deflection Space:
- : Provide a deflection space between tops of non-load-bearing walls and partitions and structures to prevent transference of structural loads to masonry.
 - : Fill deflection space with Type AF100 glass fibre board compressed to 50% of

- original thickness to completely fill space.
- : Fill voids in accordance with Section 07 84 00, Fire Stopping for assemblies requiring a fire resistance rating:
- : Deflection space shall be 1" unless otherwise designated on Drawings.
- : Co-ordinate work with installation of lateral support specified in Section 05 50 00, Metal Fabrications.

3.12 DAMPPROOF FLASHING

- .1 Install dampproof flashing continuously through exterior masonry walls, under sills and elsewhere as indicated on Drawings. Lap joints 150 mm (6").
- .2 Flush up surfaces to receive damp proof flashing with mortar, and install flashing. Ensure that no coarse aggregate or other protrusions will pierce flashing, and protect it until work resumes.
- .3 Through-wall flashings shall be dressed through full thickness of exterior wythe, across airspace and turn-up at least 150 mm (6") against inner wythe applied with approved adhesive. Install flashings prior to application of cavity wall insulation to details as shown on Drawings.
- .4 When mortar bed for flashing has set resume laying of masonry.
- .5 Where flashing is exposed to view or must bridge air-space without support, use sheet metal flashings provided and installed as part of the work of Section 07 51 12. Install sheet metal flashings after damp proof flashings but prior to others.

3.13 MECHANICAL LOUVRES, GRILLES, UNIT VENTILATORS

- .1 Construct openings in wall to accommodate sizes and details required by mechanical trades.
- .2 Seal completely around penetrations to prevent air infiltration.

3.14 PATCHING

- .1 Patch masonry walls damaged by installation of work specified under other Sections, and which have been rejected as defective or otherwise damaged.

3.15 POINTING AND CLEANING

- .1 Point all holes in mortar joints and in concrete masonry unit faces.
- .2 Cut out defective mortar joints and repoint.
- .3 Wash down and brush brick and grout/mortar to remove mortar laitance and stains. Use specified cleaners only. Consult with brick/block/grout and mortar supplier for solution strength and recommendations.
- .4 Clean concrete masonry units with brushes and as otherwise recommended by the supplier

to remove mortar and stains.

- .5 Do not use wire brushes for cleaning.
- .6 Should specified cleaning methods be insufficient, proceed with other methods only with approval of the Consultant.
- .7 Protect adjacent materials and work from damage while cleaning.

END OF SECTION 04 22 00

Part 1 General

1.1 GENERAL REQUIREMENTS

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

1.2 WORK IN OTHER SECTIONS

- .1 Related Work Specified in Other Sections

Section 03 30 00	:	Cast-in-Place Concrete
Section 05 30 00	:	Metal Decking
Section 05 50 00	:	Miscellaneous Metal

- .2 Products Supplied Under Work of this Section

and Installed Under Work of Other Sections

Section 03300	:	To install anchor bolts and loose bearings plates
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1.3 REFERENCE STANDARDS

CSA S16-19: Design of Steel Structures

CSA W59-18: Welded Steel Construction (Metal Arc Welding)

CSA G40.20-13 (R2018): General Requirements for Rolled or Welded Structural Quality Steel

CSA G40.21-13 (R2018): Structural Quality Steel

CSA W48-14: Filler Metals and Allied Materials for Metal Arc Welding

CAN/CSA G164-18: Hot Dip Galvanizing of Irregularly Shaped Articles

ASTM F3125/F3125M-15a: Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength

The Ontario Building Code, (O. Reg. 332/12)

- .1 Do structural steel work in accordance with CAN/CSA-S16.14 latest edition except where specified otherwise.
- .2 Do welding in accordance with CSA W59-13 except where specified otherwise.
- .3 All work shall conform to National Building Code and any other Provincial or local application, provided that, in any case of conflict or discrepancy, the more stringent requirements shall apply and govern.
- .4 CAN/CSA-S16.1 latest edition, "Limited States Design of Steel Structures" shall be the basis for design and construction of all structural steel on this project.

1.4 SOURCE QUALITY CONTROL

- .1 Submit 2 certified copies of mill reports covering chemical and physical properties of steel

used in this work.

- .2 Submit affidavits from the manufacturer or fabricator that materials supplied comply with this Specification.
- .3 At least one-third of the joists are to be fabricated and ready for delivery prior to calling the inspection company, thus limiting the number of visits required to three (3). All deficiencies are to be corrected prior to delivery.
- .4 The Owner will appoint an independent inspection and testing company to ensure that the Work of this Section is performed in accordance with the Specifications. The cost of all inspections/testing shall be paid for from the cash allowance allocated for this in Section 01050 - Allowances.

1.5 DESIGN OF DETAILS AND CONNECTIONS

- .1 Design details and connections in accordance with requirements of CAN/CSA-S16, latest edition, to resist forces, moments and shears indicated.
- .2 For non-standard connections, submit sketches and design calculations stamped and signed by qualified professional Engineer registered in the Province of Ontario.
- .3 For standard connections, select details from CISC Handbook of Steel Construction to ensure structural adequacy.
- .4 Submit shop fabrication details stamped and signed by a qualified professional licensed in the Province of Ontario.

1.6 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 Submittals.
- .2 Indicate shop and erection details including cuts, copes, connections, holes, bolts and welds. Indicate welds by welding symbols defined in CSA-W59-18.
- .3 Submit copy of erection drawings to the Consultant for review and reference.
- .4 Submit a copy of stamped shop drawings for the cold formed steel, including all connections.
- .5 Submit all weld procedures pertinent to the work prior to or along with the first submission of shop drawings, for subsequent review and acceptance by the Consultant.

1.7 STORAGE AND HANDLING

- .1 Handle all materials with the necessary care to prevent damage to fittings, finishes and alignments.
- .2 Materials damaged due to faulty storage or handling shall be repaired or replaced, without additional expense to the Owner, all to the satisfaction of the Consultant.

- .3 Replace promptly all items verified as received in a damaged condition.

1.8 EXAMINATION

- .1 Examine surfaces with which Work is to be anchored or connected.
- .2 Report to the Consultant, all unsatisfactory conditions likely to prevent or prejudice the proper installation of the work.
- .3 Commencement of Work implies unconditional acceptance of substrate and surface and condition to which all members are to be anchored and secured.

1.9 QUANTITY OF ITEMS

- .1 Where a component, device, item or part of material is referred to in the singular number, such reference shall mean as many as are required to complete the work.

Part 2 Products

2.1 MATERIALS

- .1 Structural steel: to CAN/CSA-G40.21 Grade 350W for rolled sections and plates, Grade 350W for Hollow Structural sections.
- .2 Anchor bolts: to CAN/CSA-G40.21, Grade 300W.
- .3 Bolts, nuts and washers: to ASTM A325M.
- .4 Welding materials: to CSA W48 Series.
- .5 Shop paint primer: to CGSB 1-GP-40M. Refer to Formulas in Section 09900.
- .6 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA G164, minimum zinc coating of 600 g/m².
- .7 Cold Formed Steel: to CSA S136
- .8 Lintels: As required to complete all work as part of this project. Steel Lintels shall be provided over all openings including mechanical, electrical and architectural drawings and as shown on the drawings.

Part 3 Execution

3.1 INSPECTION AND CO-ORDINATION

- .1 The Contractor shall field check all dimensions and elevations affecting his trade at the site. All discrepancies shall be reported to the Consultant before proceeding with the work.
- .2 The Contractor shall report in writing all defects in the work prepared under other sections

of the Specifications which will affect the work of this Section. Commencement of the work will imply acceptance of previously prepared work.

- .3 Verify all requirements and dimensions of existing, proceeding and following Work before commencing fabrication.

3.2 FABRICATION

- .1 Fabricate structural steel, as indicated, in accordance with CAN/CSA-S16.1 and in accordance only with reviewed and stamped shop drawings.
- .2 Supply fastenings, anchors and accessories required for fabrication and erection of Work. Make exposed metal fastenings and accessories of same material, texture, colour and finish as base metal on which they occur unless otherwise shown or specified. Keep exposed fastenings to absolute minimum and inconspicuous, spacing them evenly and setting them out neatly. Make fastenings of permanent type.
- .3 Beams shall be rolled sections, combined as noted. Beam connections shall be standard double angle clip type, developing full strength of all the members.
- .4 Clean all steel members by scraping, wire brushing or other effective means to remove loose mill scale, rust, oil or other foreign matter. Surfaces shall be thoroughly dry before painting.
- .5 Apply one (1) shop coat of paint, conforming to CGSB 1-GP-40D primer, to all surfaces except surfaces to be in contact with or encased in concrete and surfaces and edges to be field welded or high tension bolted.
- .6 Apply two (2) shop coats of paint, conforming to CGSB 1-GP-40D primer to all surfaces which will be inaccessible after assembling. Touch up all bolts, welds and surfaces of connecting members damaged during construction.
- .7 All steel exposed to weather including steel lintels in exterior walls shall be hot dip galvanized.
- .8 All members shall be assembled true and without twists or open joints. Shop connections shall be welded.
- .9 High tensile bolted connections, where used, shall be in accordance with CAN/CSA-S16 latest edition. Holes shall be accurately spaced and of size to allow insertion of bolts of 1.5 mm (1/16") diameter less than hole diameter.
- .10 Welding shall be executed so as to avoid damage or distortion to the work. Welds on exterior work shall be continuous to provide proper weathering; all welds on exposed finished work shall be ground smooth.
- .11 There shall be no burning of holes in members in the shop or field without the permission of the Consultant. If consent is given, burned members shall be finished to an acceptable appearance.
- .12 Mark materials in accordance with CAN/CSA-G40. Do not use die stamping. If steel is

to be left in unpainted condition, place marking at locations not visible from exterior after erection. Shop mark bearing assemblies and splices for fit and match.

3.3 ERECTION

- .1 Erect structural steel as indicated in accordance with CAN/CSA-S16 latest edition and in accordance with shop drawings.
- .2 Continuously seal members by continuous welds where indicated. Grind smooth.
- .3 Obtain written permission of the Consultant prior to field cutting or altering of structural members.
- .4 Touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
- .5 Erection of structural steel on site shall be properly co-ordinated by the Contractor with the work of all other trades. Co-ordinate the work to incorporate all electrical appurtenances, and protect same from damage during erection.
- .6 Bolted assemblies for base connections shall not be tightened until at least 72 hours after the grout pad has been placed.
- .7 All bolts shall be tightened by using a suitable torque wrench, torquing as required in CAN/CSA-S16 latest edition.
- .8 Damaged work will not be accepted on site. Damaged work arriving on site will be returned to the shop for repair and/or refinishing.
- .9 All temporary supports shall be attached to the work in such a manner so as not to mar the surface on the finished section.
- .10 All steel shall be set accurately to the lines and elevations shown on the Drawings.
- .11 Assume full responsibility for the correct plumbing, alignment and setting of all members; set all guys, braces, etc., necessary to maintain the structure during erection, and until such time as the work of other trades is in place.

3.4 OPEN WEB STEEL JOISTS

- .1 Minimum bearing, unless otherwise detailed, shall be 63.5mm (2½") on steel and 100mm (4") on concrete or masonry. Where joists span from one side only they shall bear directly over centre of beam unless otherwise shown. Open web steel joists and their design shall conform to CAN/CSA-S16 latest edition.
- .2 Shoes are to be designed so that the allowable bearing pressure on the supporting material is not exceeded.
- .3 Provide bridging in accordance with CAN/CSA S16 latest edition.
- .4 Extend and if necessary, deepen top chords of joists with cantilevered ends to carry the

specified loading indicated or implied.

END OF SECTION 05 10 00

Part 1 General

1.1 GENERAL REQUIREMENTS

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

1.2 WORK IN OTHER SECTIONS

Related Work Specified in Other Sections

Section 05 10 00	:	Structural Metal Framing
Section 05 50 00	:	Metal Fabrications
Section 06 10 11	:	Rough Carpentry
Section 07 41 00	:	Preformed Metal Roofing & Siding
Section 07 60 00	:	Sheet Metal Flashing & Trim
Section 09 90 00	:	Painting

1.3 REFERENCE STANDARDS

CSA S136S1:19: North American Specification for the Design of Cold-Formed Steel Structural Members.

CSA W59-13: Welded Steel Construction (Metal Arc Welding)

CSA W47.1:09 (R2019): Certification of Companies for Fusion Welding of Steel

CSA W48-18: Filler Metals and Allied Materials for Metal Arc Welding

- .1 Work of this section shall conform to CSA-S136-16 and to meet the specified requirements of the Canadian Sheet Steel Building Institute "Standard for Steel Roof Deck" and "Standard for Steel Floor Deck".
- .2 Welding shall meet requirements of CSA-W59-13 and undertaken to meet requirements of CSA-W47.1:09 (R2019) and CSA-W55.3-08 (R2018)

1.4 DESIGN CRITERIA

- .1 Metal deck shall be of suitable design and thickness to safely support the indicated live and dead loading over the spans shown without exceeding the maximum working stress of 143.8 MPa.
- .2 Deflection under live load only shall be not more than 1/300th of span for roof units, and 1/360th for floor units.
- .3 Metal roof deck and composite concrete slab sections shall have a depth not less than 38mm (1½").
- .4 Metal deck units shall span over three or more supports except where structural steel layout does not permit.

1.5 QUALIFICATIONS

Execute the work of this Section only by a Subcontractor who has adequate plant, equipment and skilled tradesmen, and is known to have been responsible for satisfactory work similar to that specified during a period of at least five years.

1.6 SHOP DRAWINGS

Submit shop drawings in accordance with Section 01300 Submittals.

1.7 PRODUCT HANDLING

- .1 Deliver materials as required for erection. If storage becomes necessary stack bundles of steel deck on wood blocking clear of ground and tilted slightly so as to avoid water lying on the material. Storage area to be as close to the building as is practical.
- .2 Protect deck against damage. Damaged materials shall be replaced by this Contractor without extra cost to the Owner.
- .3 Protect the work of other trades from damage during erection, welding, and cutting operations, and make good any such damage where caused.

Part 2 Products

2.1 MATERIALS

- .1 The metal roof deck shall be fabricated from Galvalume-coated steel, with a standard AZ150 conforming to ASTM A792/A792M-10(2015).
- .2 Metal roof deck for all roof areas except noted below shall be fabricated from zinc-coated steel conforming to A.S.T.M. designation A446-G5T Grade 'A' minimum steel, with a minimum decimal core thickness of 0.76 mm and a zinc coating class of G90.
- .3 Incombustible, non-hygroscopic glass fibre insulation, with a density of 1.1 lbs. per cubic foot, shaped to completely fill all flutes on the top side of acoustic deck.
- .4 Metal deck shall be manufactured by Robertson, Vic-West, or Canadian Metal Rolling Mills.

Part 3 Execution

3.1 INSTALLATION

- .1 The metal roof units shall be placed on the supporting steel framework and adjusted to final position before being permanently fastened. Each unit shall be brought to proper bearing on the supporting structure. The roof units shall be placed in straight alignment for the entire length of run of cells and with close registration of the cells of one unit with those of abutting units.

- .2 Align deck end to end to provide accurate fit with corresponding sections, with sections parallel, level and straight. All laps over supporting members shall be uniform and a minimum of 100 mm length, countersunk to provide proper nesting for deck thickness greater than 1.5 mm. Touch up all welds and fasteners with paint.
- .3 Deck units shall be securely fastened to the steel framework at the ends of the units and at intermediate supports by welds not less than 20 mm diameter, spaced not more than 300 mm along the steel frame or in other manner approved by the Consultant. Where two units abut, each unit shall be welded to the steel frame. Welds shall be free of sharp points or edges.
- .4 All welds for roof deck shall be made so that the finished deck surface is capable of sustaining an upward force of 1.44 kN/m².
- .5 The side laps of adjacent units shall be fastened between supports by clinching at intervals not exceeding 600 mm, or by 25 mm long welds at intervals not exceeding 1 m.
- .6 Damaged, bent or dished sheets shall be rejected and removed from the site.
- .7 Install closures running parallel to flutes of deck to stiffen deck at roof edges.

3.2 OPENINGS

- .1 For openings 150 mm to 450 mm in diameter or square, provide not less than 50 mm x 50 mm x 6 mm angle reinforcing to frame across holes in direction perpendicular to flutes, and weld at least two flutes on each set of holes.
- .2 Do not cut openings until final sizes have been verified on shop drawings or until steel framing provided under other sections of work is in place.
- .3 For openings larger than 450mm in diameter or square, refer to Structural, Mechanical and Architectural drawings for sizes and locations.

3.3 TOUCH UP AND REPLACEMENT

- .1 Touch up adjacent primed surfaces burned, scratched or otherwise damaged during erection with prime paint to match shop coat, when erection is completed.
- .2 Paint over bare areas on galvanized surfaces and welds with zinc rich paint.
- .3 Replace dented, punctured or weld perforated deck where exposed to view.

END OF SECTION 05 30 00

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 Conform to Division 01, General Requirements.

1.2 DESCRIPTION

.1 Work Included:

- .1 Structural metal stud exterior wall back-up framing to provide lateral support for sheathing, air barrier, exterior finish wythe and framing for wall openings and exterior finish.
- .2 Supply wire component of brick anchor to Section 04 20 00 for installation.

.2 Related Work Specified Elsewhere:

Concrete Unit Masonry : Section 04 22 00
Structural Metal Framing : Section 05 10 00

1.3 DESCRIPTION OF SYSTEM

- .1 Heavy gauge cold formed sheet steel studs span from roof to foundation wall and from shear wall to wall or column, provide rigid support for exterior wythes and air barrier and transfer lateral loads to roof edge and shear wall, foundation wall and column.
- .2 Structural stud framing panels do not carry vertical structural loads from slab above; slab above may deflect up to 12 mm at midspan, therefore cut structural stud panels 12 mm short of full slab to slab height and use loose, second slip top runner channel secured to slab above to provide lateral support only to top of stud panel.
- .3 Lateral deflection of vertical stud members to not exceed L360.

1.4 QUALITY ASSURANCE

.1 Requirements of Regulatory Agencies: Conform to the requirements of the following:

- .1 The Code Part 4, Structural Design.
- .2 CSA S16-1-M, Steel Structures for Buildings, Limit States Design.
- .3 CSA S136-M, Cold Formed Steel Structures.

.2 Industry Standards:

- .1 Steel Framing Systems manual published by Bailey Metal Products Limited.
- .2 CSSBI Light Weight Steel Framing Manual
- .3 CSSBI Standard 30M, Steel Building Systems.
- .4 CSSBI Bulletin No. 10, Wind Load Design Criteria for Steel Building Systems.

- .3 **Qualifications of Subcontractor:** Minimum of five years experience in metal stud work.
- .4 **Qualifications of Designer:** Be a Registered Professional Engineer of Ontario.
- .5 **Tolerances:** Erect stud framing plumb over entire building height and true to exterior line of building to within 5 mm each floor or suite and 10 mm overall.
- .6 **Design:** Contractor shall design the stud wall to requirements of the Ontario Building Code (OBC) 1997, CSA-S16.1-M and CSA-S136 and other Industry Publications. Design loads shall conform to OBC and CSSBI Bulletin No. 10 to deflection criteria defined.

1.5 SUBMITTALS

- .1 **Shop Drawings:** Submit shop drawings, showing all elements of exterior wall framing system and calculations for stud wall system showing design loads and deflections, bearing the stamp and seal of a Professional Engineer licensed to practice in the Province of Ontario.
- .2 Submit manufacturer's/supplier's document indicating the percent (by weight) of recycled post-consumer and/or postindustrial content of materials supplied.
- .3 Submit, on company letterhead, the dollar value of materials supplied that have been harvested and/or manufactured within 800km of the Project site.

Part 2 Products

1.6 MATERIALS

- .1 **Metal Studs:**
 - .1 Cold formed sheet steel studs conforming to CAN3 S136-M with Z25 galvanized.
 - .2 Depth of metal studs as shown on drawings, thickness shall conform to design requirements.
 - .3 With knock outs in web for horizontal services and bracing.
- .2 **Top and Bottom Runner Channels:** 'C' channels, as per metal studs, thickness as required. designed.
- .3 **Furring Channels:** 22.2 mm deep, 35 mm knurled face, minimum 0.53 core sheet thickness, Z275 galvanized.
- .4 **Gypsum Board Sheathing:** Conforming CSA A82.27-M, Canadian product with "recycled Content", 1.2 m wide by longest lengths practical, thickness 13 mm exterior grade.
- .5 **Sheathing Board:** Dens glass Gold by Georgia-Pacific, or cement board at Stucco System 2 by Roc-Crete Industries. During bidding stage, verify with Stucco Manufacturer that either product is acceptable and location of each board type.

- .6 **Screws:** Self-drilling, self-tapping, galvanized steel length and gauges to be designed.
- .7 **Brick Veneer Anchors:**
 - .1 Fabricated from 1.91 mm core thickness Z275 mill galvanized Grade D steel of 50 ksi yield strength meeting ASTM A-446.
 - .2 Designed to interlock with stud without screws but to include two screw securements to stud with vertical penetration to suit sheathing insulation and vertical slot to accommodate 5 mm diameter wire brick ties.
- .8 **Acceptable Product:** Bayonet Style Brick Connector by Bailey Metal Products Limited or approved equal.
- .9 **Isolation Strip:** 3 mm thick by 92 mm wide, foam strip.

Part 3 Execution

3.1 PREPARATION

- .1 Ensure that masonry veneer shelf angle assembly is in place at designed locations.
- .2 Ensure that concrete slabs have cured sufficiently to take fasteners without spalling or cracking, and will provide sufficient pull-out strength.

3.2 INSTALLATION

- .1 **Top Runner Channel Expansion Track:**
 - .1 Determine necessary location of top runner channel to provide plumb of wall to within specified tolerances.
 - .2 Secure continuous top runner channel in accordance with shop drawings.
- .2 **Wall Panels:**
 - .1 Assemble in accordance with shop drawings to tolerance of 1:1000.
 - .2 Fabricate with top and bottom runner channels to provide 12 mm minimum/15 mm maximum clearance within top runner expansion joint.
 - .3 Frame all openings fully with studs, include openings for doors, windows, HVAC vents, etc.
 - .4 Provide reinforced box stud assemblies at all openings, designed to resist lateral structural loads.
 - .5 Tack in place isolation strips to isolate studs from contact with concrete.
 - .6 Erect panels by tucking panel top into top runner, with seal in place, and locate bottom of panel accurately at floor.

- .7 Secure panels in place by attaching bottom runner to floor slab as per shop drawings.
- .8 Provide furring above and below location of electrical boxes set with face flush to inside of stud panel.
- .9 Provide minimum two studs extending from floor to ceiling at each side of opening wider than stud centers
- .3 **Soffits:**
 - .1 Provide necessary framing and brace back to underside of structure.
- .4 **Gypsum Board Sheathing and Sheathing Board:**
 - .1 Apply board to studs and strapping with screws. Erect board with long dimension at right angles to supports. Locate end joints over supporting members. Locate vertical joints at least 300 mm from jamb lines of openings. Space screws as per structural design requirements on board field.
 - .2 Install gypsum board at windows, doors and other openings as detailed to form a continuous fire stop assembly ready for application of transition membrane by Section 07190.
- .5 **Brick Veneer Anchors:**
 - .1 Cut accurate slots in gypsum board sheathing and sheathing board to receive brick anchors.
 - .2 Install brick veneer anchors over studs on stud webs side at designed locations.
 - .3 Secure each anchor in place with two screws.

END OF SECTION 05 41 50

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 03 30 00 – Cast-in-Place Concrete
- .3 Section 04 21 13 – Masonry
- .4 Section 05 12 23 – Structural Steel
- .5 Section 05 21 00 – Steel Joist Framing
- .6 Section 05 31 00 – Steel Deck
- .7 Section 09 91 22 – Painting

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A53/A53M-02, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
 - .2 ASTM A269-02, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
 - .3 ASTM A307-02, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer
 - .2 CAN/CGSB-1.181-92, Ready-Mixed, Organic Zinc-Rich Coating
 - .3 CISC/CPMA 1 – 73B, Quick Drying, One-Coat Paint for Use on Structural Steel
 - .4 CISC/CPMA 2 – 75, Quick Drying, Primer for use on Structural Steel
- .3 Canadian Standards Association (CSA International)
 - .1 G40.20-04: General Requirements for Rolled or Welded Structural Quality Steel
 - .2 G40.21-04 (R2009): Structural Quality Steel
 - .3 CAN/CSA G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles
 - .4 CSA S16.1-09: Limit States Design of Steel Structures
 - .5 CAN/CSA – S136-07: North American Specification of the Design of Cold-formed Steel Structural Members
 - .6 CSA W47.1-09: Certification of Companies for Fusion Welding of Steel
 - .7 CSA W59-03 (R2008): Welded Steel Construction (Metal Arc Welding)
 - .8 CSA NSS.3-1965 (r2003): Resistance Welding Qualification Code for Fabricators of Structural Members in Buildings
- .4 The Environmental Choice Program

- .1 CCD-047a-98, Paints, Surface Coatings
- .2 CCD-048-98, Surface Coatings - Recycled Water-borne

1.3 SUBMITTALS

- .1 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Deliver, store, handle and protect materials in accordance with manufacturer recommendations.
- .2 Storage and Protection:
 - .1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
 - .2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Steel sections and plates: to CSA-G40.20/G40.21, Grade 350W for hollow structural sections Class H and Grade 300W for Plates and Flat Shapes.
- .2 Welding materials: to CSA W59.
- .3 Bolts and anchor bolts: to ASTM A307.
- .4 Stainless steel tubing: to ASTM A269, Type 316 alloy, Seamless welded with AISI No. 4 finish.
- .5 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 PRIMERS, COATINGS AND SHOP PAINTING

- .1 Interior Steel in Dry Areas: Quick drying oil alkyd conforming to CISC/CPMA 2.75.

- .2 Exterior Steel, Interior Steel in Unheated Areas, Steel Embedded in Concrete: Hot dip galvanized conforming to CSA G164, minimum Z275 coating. Galvanizing of structural steel components and loose lintels: refer to Section 05 12 23.
- .3 Galvanized Coating Touch-Up: W.R. Meadows “Galvafruid” or Kerry Industries “Z.R.C.” zinc rich coating or similar manufacturer containing minimum 90% zinc by weight.
- .4 Apply two (2) shop coat(s) of primer or coating as indicated above and according to manufacturers recommendations. Do not prime aluminum, stainless steel or those components to be galvanized or encased in concrete.
- .5 Use primer unadulterated, as provided by manufacturer. Paint on dry surfaces free from rust scale and grease. Do not paint when temperature is lower than 10 deg. Celsius and rising.
- .6 Clean surfaces to be field welded; do not paint.

2.3 FASTENINGS

- .1 Use nuts and bolts conforming to ASTM A307, A325, and A563 as applicable.
 - .1 For interior work, use cadmium-plated fastenings where other protection is not specified.
 - .2 For exterior work, use Type 300 or 400 stainless steel.

2.4 ANCHORS AND SHIMS

- .1 For exposed anchorage of aluminum, if applicable, use stainless steel and otherwise to match metal anchored. For non-exposed work, anchors and shims may be galvanized steel.

2.5 PIPE

- .1 To ASTM A53, extra strong steel pipe for bollards.

2.6 BITUMINOUS PAINT

- .1 Alkali-resisting to meet specified requirements of CAN/CGSB-1.108, Type 2. Use to insulate contact between dissimilar metals.

2.7 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- .5 Weld all connections where possible, and bolt where not possible unless indicated otherwise on drawings.

- .6 Weld all stainless steel by the Argon Arc Process. Grind smooth and polish joints, crease-free, and flush without seams.

2.8 LIST OF MISCELLANEOUS METAL FABRICATIONS

- .1 This Section includes, but is not limited to the following list. Note: Galvanize all exterior items and other items noted. Prime paint all interior items.
 - .1 Anchors, Bolts, Inserts, Sleeves for work in this Section.
 - .2 Miscellaneous angles at edges of exposed ceilings to cover insulation in deck flutes.
 - .3 Lateral Support
 - .4 Bench Supports and Shelf Brackets (see ADs).
 - .5 Steel Stairs, railings, handrails.
 - .6 Fire route gate (see ADs).
 - .7 Mechanical Room Roof Access Stair & Ladder.
 - .8 Shelf Brackets and Hooks (see Drawings).
 - .9 Bollards (see ADs).
 - .10 Hangers and Supports (for work in this Section).
 - .11 Lintels (if not by Structural Steel).
 - .12 Counter Brackets
 - .13 Hafele 'hebgo' brackets (or similar) for millwork
 - .14 Exterior Roof Access Ladders

Part 3 Execution

3.1 GENERAL

- .1 Supply and install all miscellaneous metal work indicated on the Drawings and not indicated in work of other Sections in addition to items listed below.

3.2 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Provide components for building by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CSA-S16.1, or weld.

- .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding. Spray or brush apply a minimum of three (3) coats of zinc-rich paint to achieve a dry film thickness of 8 mils. Apply a finish coat of aluminum paint to provide a colour blend with the surround galvanizing.

3.3 LATERAL SUPPORT:

- .1 Install deflection space and lateral support for non-load-bearing masonry walls and partitions in accordance with specified requirements of CSA-A371-94 and CSA-S304.1-94.
- .2 50.8mm x 50.8mm x 6.4mm angles 100mm long on both sides of walls at joist bridging location. Spacing not to exceed 1800mm.
- .3 Finish: Prime paint.

3.4 MASONRY WALL LATERAL SUPPORT:

- .1 Steel angle clips: 75 x 75 x 6 x 100mm

3.5 LINTELS:

- .1 As required to complete all work as part of this project. Steel lintels shall be provided over all openings including Mechanical, Electrical and Architectural Drawings and as shown on the drawings.
- .2 Steel of sizes shown on Lintel Schedule, Structural Drawings.
- .3 Provide concealed angle clips welded to lintels and anchored with bolts at lintel supports.
- .4 Finish: Prime paint for interior and galvanized for exterior locations.
- .5 Finish: Prime paint for interior and prime painted for exterior locations.

These items refer to components which are not normally supplied by the manufacturer but required to secure the Miscellaneous Specialty items.

3.6 WALL BENCHES AND UPPER SHELF

- .1 Steel Angles, Steel Channel, Flat Bar Steel, Steel Rod as indicated on details.
- .2 Use secure round head fasteners or countersink holes for flat head screws.
- .3 Prime paint: Galvafruid.
- .4 Chamfer cut ends of Rod 2 mm.
- .5 Refer to AD drawings.

3.7 STAIRS AND GUARDRAILS

- .1 Refer to Structural Drawing for Stair Construction Components.

- .2 Refer to Drawings for dimensions, location, and guardrail details.
- .3 Metal pan stairs:
 - .1 Fabricate steel channel stringer of size, construction and attachment to structure as shown. Close exposed ends of stringers with 3 mm thick steel closure plates welded to edges of exposed flange edges.
 - .2 Furnish treads, risers and landing permanent metal forms of steel sheet formed as shown; treads to be concrete filled in accordance with Division 3, with bare metal riser incorporating 19 mm dust cove. Fabricate landings for concrete fill of same material as stair treads, unless ribbed metal deck form is shown.
 - .3 Support treads, risers and landings as detailed on reviewed shop drawings.
- .4 Handrails, guardrails, and posts:
 - .1 Design railings to withstand minimum horizontal and vertical loads as required to meet requirements of authorities having jurisdiction. In no instance shall load design of railings be less than 2.2 kN/m horizontally and 1.5 kN/m vertically.
 - .2 Close open ends of steel handrails with 1.9 mm thick closure neatly welded. Fabricate railings, handrails, and guardrails as shown on drawings.
 - .3 Provide stainless steel handrails where shown on drawings.
 - .4 Handrail bracket: Fabricate as shown. After fabrication, galvanized bracket in accordance with CAN/CSA G164-M.
 - .5 Where railings are to be anchored in cast in place concrete, provide sleeves.
- .5 Install stairs, handrails, plumb, level, rigid and secure, as per details shown on Drawings.
- .6 Secure uprights into sleeves with non-shrink, non-metallic grout. Finish grout flush with top of concrete.

3.8 GATE

- .1 Welded steel pipe construction, as shown on AD drawings. Galvanize after fabrication.

3.9 ACCESS STAIR & LADDER

- .1 Fabricate interior and exterior roof access ladders as described on drawings AD 515 & AD 517. Typical Construction is detailed on Structural Drawings.

3.10 WALL BRACKETS AND HOOKS

- .1 As shown on Drawings - prime paint.

3.11 BOLLARDS

- .1 Supply and install galvanized steel bollards as shown on Drawings. Bollards shall be 150 mm diameter x 9.5 mm thick wall at 1200 mm high, seamless steel pipe. Install 1200 mm into a concrete foundation. Fill bollard with 25 MPa concrete and round top. Round top of footing also. For number of Bollards required - refer to Drawings.
- .2 Bollard covers: Provide HDPE bollard covers for all bollards. Bollard covers: Covers fabricated from 3 mm thick high density polyethylene with high tensile strength and

solvent resistance and two recessed reflective stripes for increased visibility. Colour: Yellow colour or as approved by the Consultant. Bollard covers as manufactured by Reliance Foundry Co. Ltd. or approved alternative.

- .3 Refer to drawing AD 209.

3.12 COUNTER BRACKETS

- .1 Supply and install Hafele ‘hebgo’ brackets (or similar) @ 800 o.c. anchored to block wall for millwork in AD 618.

3.13 GALVANIZED STEEL

- .1 Galvanize steel members, fabrications, and assemblies after fabrication by the hot dip process in accordance with CSA G164, minimum Z275 coating.
- .2 Galvanize bolts, nuts and washers and iron and steel hardware components in accordance with CSA G164.
- .3 Safeguard products against steel embrittlement in conformance with ASTM A143.
- .4 Design features which may lead to difficulties during galvanizing shall be pointed out prior to dipping.
- .5 The composition of metal in the galvanizing bath shall be not less than 98.0% zinc.

3.14 ERECTION

- .1 Erect work in accordance with shop drawings and in coordination with trades whose work relates to this Section
- .2 Erect work plumb, straight, square and accurately fitted with tight joints at intersections.
- .3 Where possible install work in one continuous piece.
- .4 Anchor all components to structure, walls, and floors as required with weld or other methods of anchorage approved by the Consultant.

3.15 TOUCH-UP AND REPLACEMENT

- .1 Touch-up adjacent primed surfaces burned, scratched or otherwise damaged during erection with prime paint, to match shopcoat, or galvafrond for galvanized when erection is completed.
- .2 Paint over bare areas on galvanized surfaces and welds with zinc rich paint.
- .3 Replace damaged or unacceptable materials indicated by the Consultants.

3.16 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 10 00 – Concrete Forms and Accessories.
- .2 Section 08 11 14- Steel Doors and Frames.
- .3 Section 07 50 13 – Common Work Results for Roofing*
- .4 Section 07 50 16 – Rough Carpentry for Roofing *coordinate responsibilities with this Section and Work Division Table in Section 07 50 13.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA B111 Wire Nails, Spikes and Staples.
 - .2 CAN/CSA-G164-M92 Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA O121 Douglas Fir Plywood.
 - .4 CAN/CSA-O141-91 Softwood Lumber.
 - .5 CSA O151 Canadian Softwood Plywood.
 - .6 CAN/CSA-O325.0-92 Construction Sheathing.
 - .7 CAN/CSA-086M-01 Engineering Design in Wood.
- .2 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber.

1.3 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.
- .3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Divert unused wood materials from landfill to recycling, reuse, composting facility approved by Consultant.
- .3 Do not dispose of preservative treated wood through incineration.
- .4 Do not dispose of preservative treated wood with materials destined for recycling or reuse.

- .5 Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill approved by Consultant.
- .6 Dispose of unused wood preservative material at official hazardous material collections site approved by Consultant.
- .7 Do not dispose of unused preservative material into sewer system, into streams, lakes, onto ground or in other locations where they will pose health or environmental hazard.

Part 2 Products

2.1 LUMBER MATERIAL

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
 - .1 Douglas fir Graded 122-C, construction or No. 2 Pine, pressure treated in accordance with CSA 080M.
 - .2 Board sizes: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade.
 - .4 Post and timbers sizes: "Standard" or better grade.
 - .5 Fasteners: Proprietary fasteners toggle bolts, expansion shields and lag bolts, crews and lead or inorganic fire plugs, explosive actuated fastening devices, recommended for purpose by manufacture. Use stainless steel or galvanized for all exterior fastening and for any damp or moist areas.
 - .6 Wood Preservatives: Surface-applied wood preservative: clear copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.
 - .7 Material shall be straight, sawn square, true, dressed four sides properly sized, shaped to correct dimensions from nominal sizes noted on Drawings.

2.2 PANEL MATERIALS

- .1 Douglas fir plywood (DFP): to CSA O121, standard construction, good one side with waterproof adhesive.

2.3 ACCESSORIES

- .1 Nails, spikes, staples, screws, bolts anchors lag screws, special fastening devices and supports required for erection of all carpentry components: to CSA B111. Use galvanized components where exposed to exterior atmosphere.

2.4 FINISHES

- .1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for exterior work and interior highly humid areas.

Part 3 Execution

3.1 GENERAL

- .1 Supply and install all other carpentry shown on drawings or as required for completion of work. Co-operate with other trades in installing items supplied by other sections, cut openings in woodwork when so required and make good disturbed surfaces.

3.2 PREPARATION

- .1 Do all wood framing in accordance with the Ontario Building Code and Can3 086M 01 (2006).
- .2 Machine dressed work shall be slow fed using sharp cutters and finished members shall be free from drag, feathers, slivers or roughness of any kind.
- .3 Frame materials with tight joints rigidly held in place.
- .4 Design construction methods for expansion and contraction of the materials.
- .5 Erect work plumb, level, square and to required lines.
- .6 Be responsible for methods of construction for ensuring that materials are rigidly and securely attached and will not be loosened by the work of other trades.

3.3 FURRING AND BLOCKING

- .1 Supply and install furring and blocking, required.
- .2 Align and plumb faces of furring and blocking to tolerance of 1:600.

3.4 ROUGH BUCKS AND NAILERS

- .1 Install wood bucks and nailers, as indicated, including wood bucks and linings around frames for doors and windows.
- .2 Except where indicated, otherwise, use material at least 38 mm thick secured with 9 mm bolts located within 300 mm from ends of members and uniformly spaced at 1200 mm between.
- .3 Countersink bolts where necessary to provide clearance for other work.

3.5 ROOF FASCIAS, CANTS, NAILERS CURBS

- .1 Install wood cants, fascia backing, nailers, curbs and other wood supports for roofing, sheet metal fork, roof mounted equipment.
- .2 Secure with galvanized 9 mm bolts, where indicated, galvanized nails elsewhere. Locate fastenings within 300 mm from ends and uniformly spaced between. Space bolts at 1200 mm and nails at 600 mm centres, except where indicated otherwise.

- .3 Staple vapour retardant sheet strip to underside of nailers before installation. Apply strip continuous with 200 mm overlap at joints, free of wrinkles and tears, with at least 200 mm exposed for overlap on roof deck.

- .4 Install wood nailers for roof hoppers, dressed, tapered and recessed slightly below top surface of roof insulation.

3.6 SUPPORTS FOR MECHANICAL UNITS

- .1 Performed by Section 07 50 16. Refer to Section 07 50 13 for work division.

3.7 PRESSURE TREATED WOOD

- .1 Use wood pressure treated in accordance with CSA 080M for all wood members in contact with exterior walls and roofs.
- .2 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

3.8 GARBAGE ENCLOSURE DOORS

- .1 Supply and install 38 mm x 140 mm pressure treated wood slats to front of garbage enclosure doors.
- .2 Fasten each slat to steel frames with 2 screws at top, bottom and at diagonal bracing.

3.9 INSTALLATION OF HOLLOW METAL FRAMES

- .1 Set frames plumb and square in their exact location and at correct elevation. Firmly block and brace to prevent shifting. Shim up where required to ensure proper alignment dimensions from finished floor to head of frame. Install temporary wood spreaders at mid-height.
- .2 Where pressed steel frames are installed in concrete walls, secure frames to concrete using lead expansion shields and anchor bolts through pipe sleeves. Perform drilling of concrete as required. Fill recessed bolt heads flush to frame face with approved metal filler and sand smooth.
- .3 Install fire rated door frames in accordance with requirements of National Fire Code Volume 4, produced by The National Fire Protection Association (NFPA 80).

3.10 GENERAL

- .1 Supply and install all other carpentry shown on drawings or as required for completion of work. Co-operate with other trades in installing items supplied by other sections, cut openings in woodwork when so required and make good disturbed surfaces.

3.11 ERECTION

- .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .2 Countersink bolts where necessary to provide clearance for other work.

3.12 INSTALLATION

- .1 Lay out work carefully and to accommodate work of others. Cut and fit accurately. Erect in position indicated by drawings. Align, level, square, plumb, and secure work permanently in place. Brace work temporarily as required. Join work only over solid bracing.
- .2 Bore holes true to line and to same size as bolts. Drive bolts into place for snug fit, and use plates or washers for bolthead and nut bearings. Turn up bolts and lag screws tightly when installed, and again just before concealed by other work or at completion of work.
- .3 Co-operate with work of other Sections to ensure that unity of actions will ensure orderly progress to meet construction schedule.
- .4 Provide anchors, bolts and inserts, required for attachment of the work of this Section, to those performing the work of other Sections and who are responsible for their installation.
- .5 Work shall include rough hardware such as nails, bolts, nuts, washers, screws, clips, hangers, connectors, and strap iron required for installation of work and all operating hardware required on work of this Section for temporary use.
- .6 Do not attach work by wood plugs or blocking in concrete or masonry. Use lead shields, expansion shields, concrete nails, or similar methods only as approved by the Architect.
- .7 Do not regard grounds, blocking, furring, and such other fastening provisions as shown on Drawings as exact or complete. Provide required provisions for fastening, located and secured to suit site conditions, and adequate for intended support.
- .8 Cut fastening work into lengths as long as practicable and with square ends. Erect work plumb, in true planes, and fastened rigidly in place.
- .9 Grounds around openings in cavity wall systems, under sills and thresholds to provide continuous support shall be 50mm (2") minimum thickness, preservative treated.
- .10 Install supports and furring members as required to receive components of cabinetwork.
- .11 Install blocking at roofs, as indicated on Drawings, secured permanently to structure, trimmed and levelled to accommodate roofing components, and to receive flashings.
- .12 All members shall be accurately cut to length, angle and be true to line to assure tight joints.
- .13 Correct alignment and plumb must be maintained until specified lateral bracing is installed. Cutting and altering of trusses is not permitted except by approval by the Engineer. Heavy concentrated loads must not be placed on top of trusses until permanent bracing and decking have been installed. In any event, these temporary loads must not exceed the truss design loads.

3.13 SCHEDULES

- .1 Provide electrical equipment backboards for mounting electrical equipment as indicated. Use 19mm thick plywood on 19 x 38 mm furring around spacing, perimeter and at maximum 300 mm intermediate

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 06 10 11 – Rough Carpentry.
- .3 Section 09 91 22 - Painting.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A208.1 Particleboard.
 - .2 ANSI A208.2, Medium Density Fiberboard (MDF).
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM E1333, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
 - .2 ASTM D2832, Standard Guide for Determining Volatile and Non-volatile Content of Paint and Related Coatings.
 - .3 ASTM D5116, Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.
- .3 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
 - .1 AWMAC Quality Standards for Architectural Woodwork.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-71.20, Adhesive, Contact, Brushable.
- .5 Canadian Standards Association (CSA)
 - .1 CSA B111, Wire Nails, Spikes and Staples.
 - .2 CSA O112.4, Standards for Wood Adhesives.
 - .3 CSA O112.5-Series-M, Urea Resin Adhesives for Wood (Room- and High-Temperature Curing).
 - .4 CSA O112.7-Series M, Resorcinol and Phenol-Resorcinol Resin Adhesives for Wood (Room- and Intermediate-Temperature Curing).
 - .5 CSA O115, Hardwood and Decorative Plywood.
 - .6 CSA O121, Douglas Fir Plywood.
 - .7 CAN/CSA O141, Softwood Lumber.
 - .8 CSA O151, Softwood Plywood.
 - .9 CSA O153, Poplar Plywood.
 - .10 CSA Z760, Life Cycle Assessment.
- .6 Environmental Choice Program (EPC)

- .1 ECP-44, Adhesives.
- .2 ECP-45, Sealants and Caulking Compounds.
- .3 ECP-76, Surface Coatings.
- .7 International Organization for Standardization (ISO)
 - .1 ISO 14040, Environmental Management-Life Cycle Assessment - Principles and Framework.
 - .2 ISO 14041, Environmental Management-Life Cycle Assessment - Goal and Scope Definition and Inventory Analysis.
- .8 National Electrical Manufacturers Association (NEMA)
 - .1 NEMA LD-3.
- .9 National Hardwood Lumber Association (NHLA)
 - .1 Rules for the Measurement and Inspection of Hardwood and Cypress.
- .10 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate details of construction, profiles, jointing, fastening and other related details.
 - .1 Scales: profiles full size, details 1/2 full size.
- .3 Indicate materials, thicknesses, finishes and hardware.

1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate samples: sample size 300 x 300 mm samples of each type of paneling laminate, melamine and each type of solid wood or plywood to receive stain or natural finish.
- .3 Submit a typical prototype unit representative of the work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Protect millwork against dampness and damage during and after delivery.
- .2 Store millwork in ventilated areas, protected from extreme changes of temperature or humidity.

Part 2 Products

2.1 MATERIALS

- .1 Softwood lumber: unless specified otherwise, S4S, moisture content 10 % or less for interior work in accordance with following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
 - .3 AWMAC premium grade, moisture content as specified.
- .2 Hardwood lumber: moisture content 10 % or less for interior work in accordance with following standards:
 - .1 National Hardwood Lumber Association (NHLA).
 - .2 AWMAC premium grade, moisture content as specified.
 - .3 Species: to be Maple unless otherwise noted.
- .3 Hardwood plywood: to CSA O115, of thickness indicated, rotary cut face veneer, birch plywood, veneer core, No. 1 grade. Select veneers to provide book match veneer strips to be 240 mm wide minimum.
 - .1 Species: to be Birch or Maple, unless otherwise noted.
- .4 Nails and staples: to CSA B111, galvanized for exterior work, interior high-humidity areas and for treated lumber; plain finish elsewhere. Use spiral thread nails except where specified elsewhere.
- .5 Particle Board core: to CAN3-0188.1-M78, minimum 45 density, in thickness indicated.

2.2 PLASTIC LAMINATE

- .1 Conforming to CAN3-A172, General Purpose - standard grade (GP-S), 1.25 mm thick for tops, Post Forming - standard grade (PF-S) 1.25 mm thick for post forming. Balance all panels with 0.5 mm backing sheet (BK) by same manufacturer as face panel. Use waterproof adhesive capable of holding materials together without failure.
- .2 Acceptable Manufacturers include: Formica, Nevamar-ARP abrasion resistant surface distributed by McFaddens, or Arborite. Submit product data. Allow for maximum of 4 colours from full range as chosen by Consultant.

2.3 MELAMINE FACED PARTICLEBOARD

- .1 To CAN3-0.188.1-M78, minimum 45 density, particleboard sanded faces, 13 mm, 16 mm, and 19 mm thickness, faced with laminated plastic on both sides. Melamine resin impregnated cover sheet with coloured and/or pattern paper inner layer. Thermally fuse to rigid particleboard substrate. Melamine faces shall be 8 mil thickness. Wood grain pattern to be “Hard Rock Maple”.
 - .1 Acceptable Material: Melamine faced particleboard as manufactured by Flakeboard, Formica or Arborite Division of Domtar Construction Materials Ltd., are of acceptable quality but colour/pattern requires approval prior to confirmation of full acceptance. No alternatives or substitutions are acceptable.

2.4 EDGE BANDING

- .1 Solid polyvinyl chloride (PVC), 3 mm thickness x full width of panel edge banding, colour/pattern to match finished face of melamine panel or as selected by Consultant. All exposed edges of banding to be radiused to 2 mm radius after installation on panels. Submit sample of edge-banded panel with radiused edges to Consultant for approval prior to fabrication of architectural woodwork.
 - .1 Acceptable Material: Solid PVC edging as manufactured by “Woodtape” Edge-Banding.
 - .2 Acceptable Material: Solid PVC edging as manufactured by “Complast Inc.”
- .2 All exposed edges are to have edge banding, including front facing edges of shelves within units, doors and gables (including edges facing floor).

2.5 CABINET HARDWARE

- .1 Furnish and install all hardware to custom casework as follows:
 - .1 Cupboard Doors - 19 mm thick.:
 - .1 Hinges 110° Blum or Hettich
 - .2 Roller Catches 807N 2G(SgDr) Onward
 - .3 Elbow Catches T03222 C15 (DhDr)
 - .4 Door Pulls CBH235-3 1/2” C32D
 - .5 Cupboard Locks 8703/8704 14a National
 - .2 Drawers - 19 mm thick.:
 - .1 Drawer Slides “Accuride Slide” 3832-2G full extension with ball bearing rollers, 100lb. capacity
 - .2 Drawer Pulls CBH235-3 1/2” C32D
 - .3 Drawer Locks 8703 - 14a National
 - .3 Shelving:
 - .1 System 32 with 5mm holes, 32mm apart
 - .2 Ferow sleeves for adjustable shelving
 - .4 Display Cabinet Shelving:
 - .1 Pilaster strips KV255 Zinc Knape & Vogt
 - .2 Shelf Clips KV256 Zinc Knape & Vogt
 - .5 Cupboard Doors - 35 mm thick.:
 - .1 Hinges F179 76x76 Stanley C15
 - .2 Roller Catches 504N Onward C26
 - .3 Surface bolt 043-4 X Angle Strike C15
 - .4 Door Pulls CBH245-4 1/2” C32D
 - .5 Cupboard Locks supplied and installed under Section 08710
 - .6 Closet Rods and Flanges
 - .1 Rods: chrome finish, Ø 33 mm.
 - .2 Flanges: chrome finish, closed flanges at both ends of rods.
 - .7 Shelf and Rod Steel, white enamel, model No. 1797, manufactured by Hager.

- .8 Display Case Frame
 - .1 Tracks Knappe & Vogt KV P1092
 - .2 Locks Knappe & Vogt KV 963
 - .3 Knife Brackets Knappe & Vogt KV 180
 - .4 Standards Knappe & Vogt KV 80
- .9 Kindergarten Toy Carts
 - .1 Rubber Bumpers Colson 6905, Grey
- .10 Plastic Grommets
 - .1 50mm black with plastic cover insert
- .11 Teacher's Closets
 - .1 'D pull' handle with a cabinet deadbolt lock CL777R by Schlage Portable Security and Cabinet Lock with full-size interchangeable core (FSIC). To be keyed alike to the classroom door.
- .2 Acceptable alternates: equivalent cabinet hardware products by Blum, Hager & Stanley. 19mm Cabinet door hinges must be Blum or Hettich.
- .3 This section shall also include accessories such as rubber door silencers (2 per drawer or door), and other items necessary for the completion of the millwork.

2.6 MELAMINE CLAD CABINETWORK

- .1 All cabinet frames whether for base, wall or tall floor standing cases, shall be fabricated so each is a self-contained module. Front side top and bottom, exterior and interior surfaces shall be finished allowing future relocation of any module, into any bench arrangement, without need of any additional finishing. Melamine gables are not to be in contact with floor. All wood bases are to be wrapped with rubber base.
- .2 Maximum width between gables shall be 900mm.
- .3 Gables and panels shall be fabricated from 19 mm thick melamine surfaced panels with a P.V.C. edging applied to all exposed edges including exposed edge facing floor.
- .4 Bottoms shall be fabricated utilizing the same materials and edge finish as gables. Front edge will be edged with solid 3 mm thick PVC edging. All other edges will be thoroughly sealed and moisture proofed prior to attachment to gables.
- .5 Rails shall be fabricated and machined to join the gables and form a rigid cabinet frame.
- .6 Tops (applies to wall and tall units only) shall be fabricated utilizing the same material and edge finish as gables. Front edge will be edged with P.V.C. edging.
- .7 Toe kick rail shall have a 100 mm x 19 mm section, machined to receive four screw nails for attachment to bottom front edge of gables. Cabinet base shall be plywood attached to melamine cabinet separately, insuring the melamine particle core gables do not come in contact with the floor.
- .8 Backs in base cupboards shall be fabricated from a 13 mm thick melamine surfaced panels.

- .9 Backs in wall and tall cabinets shall be fabricated from 13 mm thick melamine surfaced panels securely glued and screw nailed into the check out provided in the backs of gables, tops, and bottoms.
- .10 Shelves shall be fabricated from 25 mm melamine surfaced panels with a P.V.C. edging applied to front edge. All shelves shall be adjustable using System 32, with 5mm holes spaced at 32mm apart. Shelves are to have ferow sleeves inserted.
- .11 Doors shall be fabricated from 19 mm thick melamine surfaced panels. All four edges shall be P.V.C. edging.
- .12 Drawer fronts shall be fabricated from 19mm thick melamine surfaced panels. All four edges shall be P.V.C. edging. Fronts will be secured to drawer bodies with five screw nails through the front of the drawer body into the core of the drawer front.
- .13 Drawer bodies shall consist of box construction fabricated from 13 mm thick melamine surfaced panels front, sides and back with PVC edging on top edges. Joint front, sides and back with carefully fitted glued and tenoned joints. Alternately, Blum Metabox drawer body and side can be used.
- .14 Finish:
 - .1 Melamine surfaced panels shall be finished both sides in Hard Rock Maple.
 - .2 Miscellaneous solid hardwood pieces shall be sanded, then sealer coated, and sanded with two finish coats of catalytic type varnish.

2.7 SHOP FABRICATION

- .1 Shop install cabinet hardware.
- .2 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .3 Shop assemble work for delivery to site in size easily handled and to insure passage through building openings.

2.8 BENCHES

- .1 32 x 92 solid maple boards with 32 x 108 solid maple edges. Lengths, as indicated on Plans, secured to metal supports. Polyurethane finish, semigloss. Refer to AD drawings.

2.9 WOOD MILLWORK WALL PANELS

- .1 Provide 19mm thick white oak veneer wall panels with solid wood edging at Student Forum 108, as described on Interior Elevations. Polyurethane finish, satin.

2.10 PLASTIC LAMINATED TOPS

- .1 19 mm thick particle board core with post-forming grade plastic laminate finish bonded with resorginal formaldehyde resin glue to a particleboard core. All countertop front face to return vertically 35 mm \pm . All front and backsplash edges to be rounded.

- .2 Underside to receive a backing sheet, sanded one side and bonded same as surfacing material.
- .3 Exposed edges to be finished with same material as used for the top.
- .4 Drip grooves to be cut into underside of the top where exposed edges occur.
- .5 Splash backs, curbs and curb shelves are to be of similar construction as the tops.
- .6 At all wall termination, provide backsplash return.

2.11 SOLID SURFACE COUNTER TOPS

- .1 For countertops in:
 - .1 Music Room
 - .2 Art Room
 - .3 Science Room
- .2 Countertops as noted to be solid non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment; not coated, laminated or of composite construction;
- .3 Acceptable manufacturers:
 - .1 Corian® by DuPont; www.corian.com
 - .2 Samsung Chemical USA (excluding Tempest Series); www.staron.com
 - .3 Wilsonart Contract (excluding 025 series); www.wilsonartcontract.com
- .4 Submit two 300 x 300 samples of all surfacing to show all edge details, cutouts, and splashes etc.

2.12 MOULDING AND TRIMS

- .1 Fabricate mouldings in maximum practical lengths to profile shown. Install with concealed fasteners.

2.13 FABRICATION

- .1 Set nails and countersink screws apply plain wood filler to indentations, sand smooth and leave ready to receive finish.
- .2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .3 Shelving to cabinetwork to be adjustable unless otherwise noted.
- .4 Provide cut-outs for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.

- .5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- .6 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .7 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .8 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- .9 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .10 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .11 Apply laminated plastic liner sheet where indicated.

2.14 CABINET LOCKS

- .1 Supply and install matching locksets to all cupboard and drawer units.
- .2 Locksets for all groups of units to be keyed alike and keying to be grouped as follows:
 - .1 Key 1: Kindergartens
 - .2 Key 2: Library Resource and Work rooms and Computer Resource Room
 - .3 Key 3: Classrooms
 - .4 Key 4: Seminar and Resource Rooms
 - .5 Key 5: Work room, Heath Room and Ortho washroom.
- .3 Provide minimum of six identical keys matching all lock types.
- .4 Provide locks in the following numbers to specific units:
 - .1 Kindergarten: all uppers and lowers and all tall cupboards
 - .2 Classrooms (incl. Special Education, Art, Science, Music etc.): all uppers and all lowers.
 - .3 Childcare Rooms: to all upper and lower millwork units (incl. kitchen area).

2.15 LOCKING STEEL CASTERS

- .1 Supply and install to all mobile Kindergarten toycarts a 4" locking swivel "Steel Shop Casters" by Lee Valley, model number 00K20.01.
- .2 Quantity required: 12 casters to outfit 3 toycarts per Kindergarten Classroom (4 casters per cart).
- .3 Reinforce underside of toycart with additional layer of plywood to minimum 100 mm all sides of each base connection.

2.16 RUBBER BUMPERS

- .1 Supply and install to all mobile Kindergarten toycarts and the Library/Resource Centre Bookcart shown on AD641 and AD642: 4"x 4" rubber bumpers
- .2 Quantity required: 8 bumpers for each cart.

2.17 MODULAR CONTROL PANELS

- .1 To be supplied by Electrical Div. 26.

2.17 SLIDING WOOD DOOR & HARDWARE

1. Solid core doors shall be constructed with urea-formaldehyde free particle board to ANSI A208.1, ID2.
2. Doors shall be provided with vision panels as called for on the Door Schedules and supplied
3. Crossband – 3 ply hardwood plywood not less than 1/8” thick before sanding
4. Stiles and rails to be low density softwood staved type minimum 1 ½” wide with ¾” thick hardwood edge banding. Moisture content shall not exceed 8%.
5. Face veneer shall be plastic laminate from Nevamar Plastic Laminate ARP surface distributed by McFaddens. Approved alternates by Wisonart, Formica or Arborite. Allow for maximum of 2 colours from full range, including solids and wood grains as chosen by Consultant.
6. Colours to later selection by Consultant as specified in Plastic Laminates.
7. Door cores unframed, solid laminated wood stave core construction, comprising narrow pieces of kiln dried wood, grain running vertically and end joints well staggered, solid, (no voids) and electronically glue bonded. Floating core construction will not be accepted. Sand door cores both sides prior to application of faces.
8. Seal top and bottom edges with two coats urethane finish or lacquer applied to door manufacturer’s plant.
9. Preparation of doors shall include provision for sliding door hardware.

Part 3 Execution

3.1 INSTALLATION

- .1 Manufacture architectural woodwork to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- .2 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.
- .3 Set and secure all material and components in place, rigid, plumb and square.
- .4 Provide heavy duty fixture attachments for wall mounted cabinets.
- .5 Use draw bolts in countertop joints.
- .6 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant.

- .7 Apply water resistant building paper over wood framing members in contact with masonry or cementitious construction.
- .8 After installation, fit and adjust operating hardware for wood and laminated plastic cabinet doors, drawers and shelves.

3.2 CLEANING

- .1 Clean millwork and cabinet work inside cupboards and drawers and all outside surfaces.
- .2 Remove excess glue from surfaces.

3.3 PROTECTION

- .1 Protect millwork and cabinet work from damage until final inspection.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 064000:Architectural Woodwork

1.2 REFERENCES

- .1 CAN/CGSB-71.20-M88 Adhesive, Contact, Brushable
- .2 CAN3-A172-M79 High Pressure Paper Base, Decorative Laminates.
- .3 CSA O112 Series CSA Standards For Wood Adhesives.
- .4 CSA O121 Douglas Fir Plywood.
- .5 CSA O151-04 Canadian Softwood Plywood.

1.3 SAMPLES

- .1 Submit duplicate samples of joints, edging, cutouts and postformed profiles in accordance with the General Conditions.

1.4 MAINTENCE DATA

- .1 Provide maintenance data for laminated plastics work for incorporation into Operation and Maintenance Manual.

1.5 PRODUCT HANDLING

- .1 Cover finished laminated plastic surfaces with heavy kraft paper or put in cartons during shipment. Protect installed laminated surfaces by approved means. Do not remove until immediately before final inspection.
- .2 Do not store or install materials in areas where relative humidity is less than 25% or greater than 60% at 22 deg C.

Part 2 Products

2.1 GENERAL

- .1 Products manufactured by one of the following companies are suggested for use on this project.
 - .1 Cyanamid Canada Inc., Montreal (Formica).
 - .2 Domtar Construction Materials, Arborite Division, LaSalle Quebec (Arborite).
 - .3 Wilsonart International, Temple, Texas (Wilsonart).
 - .4 Nevamar Corporation, Odenton Md.

- .2 Allow for 4 colours of matte finish from manufacturer's standard range. Final Selection of Plastic Laminate surface characteristics including colour, texture and pattern is to be made by the Consultant by means of a Colour Schedule to be issued at a later date. Use the following materials specifications as a base bid:

2.2 MATERIALS

- .1 Laminated plastic for flatwork: to CAN3-A172, Grade GP, Type SD, 1.25mm (0.050") thick; based on solid colour range with velour finish. Acceptable products:
 - .1 Formica Laminate Grade 10.
 - .2 Nevamar H-5 General Purpose Grade.
 - .3 Wilsonart General Purpose HGS Type 107.
- .2 Laminated plastic for postforming work: to CAN3-A172, Grade PF, Type S, 1.07mm (0.042") thick, based on solid colour range with velour finish. Acceptable products:
 - .1 Formica Laminate Grade 12.
 - .2 Nevamar HF-5 Horizontal Post Forming Grade.
 - .3 Wilsonart Postforming Type 350.
- .3 Plastic Laminate Art Panels applied to walls (Corridor 110A): 4'x8' plastic laminate sheets applied to 19mm particle board with plastic laminate edging. Plastic laminate sheets to be Wilsonart 'Out of the Box' laminate; pattern "Mountain Resort – Y0005" with Matte finish Y0005-60.
- .4 Laminated plastic cabinet liner sheet material or for MCP Board or Cladboard material: supplied by same manufacturer as facing sheet, not less than 0.760 mm (0.028") thick, white colour. Acceptable products:
 - .1 Formica Laminate Grade 20.
 - .2 VF-3 Vertical Post Forming Grade by Nevamar.
 - .3 Wilsonart Vertical Surface Type 335.
- .5 Plywood core: Douglas Fir Plywood to CSA-O121 or Canadian Softwood Plywood to CSA-O151 solid two sides, 19 mm (¾") thick.
- .6 Particleboard core: to CAN3-O188.1, Grade R, sanded faces, of thickness indicated.
- .7 Adhesive for laminated plastic: to be CSA approved and one of the following types as selected by the laminate manufacturer as being suitable for the application:
 - .1 Urea resin adhesive to CSA O112 Series.
 - .2 Contact adhesive to CAN/CGSB-71.20.
 - .3 Resorcinol resin adhesive to CSA O112.
 - .4 Polyvinyl adhesive to CSA O112.

- .5 Two component epoxy thermosetting adhesive.
- .8 Sealer: water resistant sealer or glue acceptable to laminate manufacturer.
- .9 Sealant: of a type recommended by the laminate manufacturer and in accordance with Section 079210 - Joint Sealers; colour to be selected by the Consultant.
- .10 Draw bolts and splines: as recommended by fabricator.
- .11 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .12 Apply laminated plastic liner sheet to interior of cabinetry, including all exposed surfaces such as gable ends, doors and drawers, and where otherwise indicated.

Part 3 Execution

3.1 INSTALLATION

- .1 Install work plumb, true and square, neatly scribed to adjoining surfaces.
- .2 Make allowances around perimeter where fixed objects pass through or project into laminated plastic work to permit normal movement without restriction.
- .3 Use draw bolts and splines in countertop joints. Maximum spacing 450 mm (18") oc, 75 mm (3") from edge. Make flush hairline joints.
- .4 Provide cutouts for inserts, grilles, appliances, outlet boxes and other penetrations. Round internal corners, chamfer edges and seal exposed core.
- .5 At junction of laminated plastic counter back splash and adjacent wall finish, apply small bead of sealant.
- .6 Where laminated plastic is site applied, adhere laminated plastic over entire surface. Make corners with hairline joints. Use full sized laminate sheets. Make joints only where indicated or approved. Slightly bevel arises. Cap exposed edges with anodized aluminum extrusions.
- .7 For site application, offset joints in plastic laminate facing from joints in core.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for asphalt for use as waterproofing.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 51 00 - Temporary Utilities.
- .3 Section 312310- Excavating, Trenching and Backfilling
- .4 Section 033000- Cast- in-Place Concrete
- .5 Section 042113- Masonry

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
 - .2 CAN/CGSB 37.3-M89, Application of Emulsified Asphalts for Dampproofing or Waterproofing.
 - .3 CAN/CGSB 37.5-M89, Cutback Asphalt Plastic Cement.
 - .4 CGSB 37-GP-6Ma-83, Asphalt, Cutback, Unfilled, for Dampproofing.
 - .5 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
 - .6 CGSB 37-GP-11M-76, Application of Cutback Asphalt Plastic Cement.
 - .7 CGSB 37-GP-12Ma-84, Application of Unfilled Cutback Asphalt for Dampproofing.
 - .8 CGSB 37-GP-15M-76, Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
 - .9 CAN/CGSB 37.16-M89, Filled, Cutback, Asphalt for Dampproofing and Waterproofing.
 - .10 CAN/CGSB 37.28-M89, Reinforced Mineral Colloid Type, Emulsified Asphalt for Roof Coatings and for Waterproofing.
 - .11 CGSB 37-GP-36M-76, Application of Filled Cutback Asphalts for Dampproofing and Waterproofing.
 - .12 CGSB 37-GP-37M-77, Application of Hot Asphalt for Dampproofing or Waterproofing.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA A123.4, Bitumen for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems.
- .3 Health Canada

- .1 Workplace Hazardous Materials Information System (WHMIS)
 - .1 Safety Data Sheets (SDS).
- .4 National Research Council Canada (NRC)/Institute for Research in Construction (IRC)
 - .1 Canadian Construction Materials Centre (CCMC)

1.4 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures .
- .2 Submit product data sheets for bituminous dampproofing products. Including:
 - .1 Product characteristics.
 - .2 Performance criteria.
 - .3 Application methods.
 - .4 Limitations.
- .3 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, and cleaning procedures.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Provide and maintain dry, off-ground weatherproof storage.
- .2 Store materials on supports to prevent deformation.
- .3 Remove only in quantities required for same day use.
- .4 Store materials in accordance with manufacturer's written instructions.
- .5 Store solvent base liquids away from excessive heat and open flame.
- .6 Store emulsion liquids at above freezing temperatures, free from contact with cold or frozen surfaces.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Ensure emptied containers are sealed and stored safely.
- .3 Fold up metal banding, flatten and place in designated area for recycling.
- .4 Divert unused bituminous waterproofing, sealing compounds and asphalt primer materials from landfill to recycling facility approved by Consultant.

1.7 PROJECT/SITE ENVIRONMENTAL REQUIREMENTS

- .1 Temperature, relative humidity, moisture content.
 - .1 Apply waterproofing materials only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

- .2 Do not proceed with Work when wind chill effect would tend to set bitumen before proper curing takes place.
- .3 Maintain air temperature and substrate temperature at dampproofing installation area above 5 degrees C for 24 hours before, during and 24 hours after installation.
- .4 Do not apply dampproofing in wet weather.
- .2 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.
- .3 Ventilation:
 - .1 Ventilate area of Work as directed by Consultant by use of approved portable supply and exhaust fans.
 - .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
 - .3 Provide continuous ventilation during and after waterproofing application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of waterproofing installation.

1.8 QUALIFICATIONS AND QUALITY ASSURANCE

- .1 Waterproofing shall be carried out by applicators skilled and with previous similar experience in this work in strict accordance with manufacturer's printed instructions. Submit proof of experience upon Consultant's request.
- .2 Manufacturer's representative shall be called by the applicator to inspect the substrate prior to commencement of work.
- .3 Manufacturer's representative shall be retained by installer to provide technical assistance on a as-needed basis during course of installation of membrane.

1.9 EXTENDED WARRANTY

- .1 Contractor performing the work of this Section, shall provide a full materials and labour warranty for 5 years from the date of Substantial Performance of the Contract.
- .2 Contractor hereby warrants that the waterproofing membrane will stay in place and remain leakproof in accordance with the Contract, but for 5 years.
- .3 Waterproofing membrane manufacturer shall provide a written warranty that the waterproofing membrane will remain in a watertight condition and will not leak as a result of faulty materials for a period of ten years.

Part 2 Products

2.1 MATERIALS

- .1 Locations: Walls below grade adjacent to sodded and planted areas. Refer to Drawings for typical wall sections.

- .2 Primary Waterproofing Membrane for Vertical Foundation Walls: Cold applied elastomeric asphalt emulsion waterproofing membrane in compliance with CGSB 37.2 shall be Aqua-Bloc 720-38 Elastomeric Asphalt Emulsion Waterproofing Membrane as manufactured by Henry, a one component waterproofing compound compatible with sheet waterproofing membranes and substrates, having the following characteristics:
 - .1 Elongation: 2000%,
 - .2 Maximum VOC: 10 g/l
 - .3 Water vapour permeance: 10 ng/Pa.m².s, ASTM E96,
 - .4 Chemical resistance: Alkalis, calcium chloride, mild acid and salt solutions.
 - .5 Approved alternate Mel-Rol LM by W.R. Meadows of Canada, Poly-Tuff PT-60 by Poly-Tuff Systems International.
- .3 Fabric Reinforcement for Cold Applied Waterproofing: Fabric reinforcement shall be 990-06 Yellow Jacket as supplied by Henry, a glass reinforcement sheet capable of allowing the membrane to bleed through adequately to provide a monolithic reinforced membrane system.
- .4 Prefabricated Drainage Board for Vertical Surfaces: DB 2000 Prefabricated Composite Drain Board as manufactured by Henry Company, a polypropylene core board with polypropylene fabric attached, having the following physical properties:
 - .1 Flow Rate: 223 L/min/m,
 - .2 Compressive Strength: 11,000 psf,
 - .3 Thickness: 10 mm
 - .4 Approved Alternate: Mel-Drain 5012B by W.R. Meadows of Canada.
- .5 Prefabricated Drainage Board Accessories
 - .1 Securement Bars: Continuous 6mm x 20mm (1/4" x 3/4") HDPE bar for screw attachment.
 - .2 Moulding Strip: Continuous 90mm wide "Z" flashing strip to fit over exposed top edge of drain board.
 - .3 Drain Board Plugs & Nails: HDPE pre-moulded washer to fit dimples c/w high strength, corrosion resistant concrete nails, UCAN AFH 37 or equal.
 - .4 Termination Sealant: Polybitume 570-05 Polymer Modified Sealing Compound as manufactured by Henry, a polymer modified sealing compound, compatible with sheet waterproofing membrane, substrate and insulation materials, complies with CGSB 37.29, remains flexible with ageing and chemically resistant to alkalis, calcium chloride, mild acid and salt solutions.

Part 3 Execution

3.1 WORKMANSHIP

- .1 Keep hot asphalt:
 - .1 Below its flash point.

- .2 At or below its final blowing temperature.
- .3 Within its equiviscous temperature range at place of application.

3.2 PREPARATION

- .1 Before applying waterproofing:
 - .1 Seal exterior joints between foundation walls and footings, joints between concrete floor slab and foundation and around penetrations through waterproofing with sealing compound.
 - .2 Before commencing work, ensure environmental and site conditions are suitable for installation of waterproofing membrane.
 - .3 The substrate shall be clean and dry, free from surface water, ice, snow or frost, dust, dirt, oil, grease, curing compounds or any other foreign matter detrimental to the adhesion of the waterproofing membrane.
 - .4 Can be applied to damp or new green concrete. Ensure concrete is smooth and free from voids and honeycombing prior to application of waterproofing membrane.
 - .5 Voids, cracks, holes and other damages to horizontal or vertical surfaces shall be repaired before application of the membrane.
 - .6 Notify Consultant and Contractor in writing of unsuitable surfaces and working conditions. Commencement of work shall imply acceptance of surfaces and working conditions.

3.3 MOCK UP

- .1 Construct a 3 m x 2 m mock-up area for each separate job condition for inspection by the Consultant prior to proceeding with the work. Mock-up may be part of finished work.
- .2 Notify Consultant and allow 24 hours for inspection by Consultant.

3.4 DECK TO VERTICAL JUNCTURES, FOOTINGS/FOUNDATION WALLS, CRACKS IN SLABS AND PROTRUSIONS

- .1 Coat penetrations, such as brackets, clips, braces, etc. that are set into the concrete with a 2.3 mm (90 mil) coating of primary waterproofing membrane to the height of the wearing course and around projections to ensure a complete seal prior to coating the entire area.
- .2 Penetrations subject to movement should be flashed with fabric reinforcement set into a minimum thickness of 2.3 mm (90 mil) of primary waterproofing membrane to required height on the wall and at least 100 mm (4") on the slab, embed fabric reinforcement into wet coating followed by second coat.
- .3 To all cracks and cold joints less than 3 mm (1/8") apply a coat of primary waterproofing membrane at a minimum thickness of 2.3 mm (90 mil) and reinforce with fabric reinforcement.
- .4 To all cracks greater than 3 mm (1/8"), prime area and install self-adhered flashing membrane. Overlap end joint of sheet a minimum 75 mm (3").
- .5 At monolithic wall/slab junctures, apply primary waterproofing membrane at a minimum thickness of 2.3 mm (90 mil) to required height on the wall and at least 100 mm (4") on

the slab and embed fabric reinforcement into wet primary waterproofing membrane followed by a second coat.

- .6 At non-monolithic wall/slab junctures, prime area, trowel-in fillet bead to inside corners and install self-adhered flashing membrane sheet to the required height on the wall and at least 100 mm (4") on the slab. Lap primary waterproofing membrane over a minimum of 50 mm (2").
- .7 At footing to foundation wall junctions apply a coat of primary waterproofing membrane at a minimum thickness of 2.3 mm (90 mil) and reinforce with fabric reinforcement followed by second coat.

3.5 WATERPROOFING MEMBRANE VERTICAL APPLICATION

- .1 Apply a full and continuous coat of primary waterproofing membrane at approximately 1.5 l/m² (3.6 gal. US/100ft²) and embed fabric reinforcement into coating ensuring no fishmouths or wrinkles are created and allow to set.
- .2 Apply second full and continuous coat of primary waterproofing membrane at 1.5 l/m² (3.6 gal./100ft.²) and allow to cure.

3.6 WATERPROOFING MEMBRANE HORIZONTAL APPLICATION

- .1 Apply a full and continuous coat of primary waterproofing membrane at approximately 1.5 l/m² (3.6 gal. US/100ft²) and embed fabric reinforcement into coating ensuring no fishmouths or wrinkles are created and allow to set.
- .2 Apply second full and continuous coat of primary waterproofing membrane at 1.5 l/m² (3.6 gal./100ft.²) and allow to cure.

3.7 INSTALLATION OF PROTECTION BOARDS

- .1 Protection Boards shall be installed over the waterproofing membrane to prevent damage from materials used in backfilling.
- .2 Allow waterproofing to cure dry and apply protection board adhesive in 12mm wide strips spaced at 450 mm o/c to cure waterproofing membrane. Immediately embed protection board and press into adhesive to ensure full contact.
- .3 Do not backfill until adhesive has cure dried. Do not use excessive levels of adhesive.

3.8 APPLICATION OF DRAINAGE BOARD VERTICAL

- .1 Align and hang drainage up to foundation wall. Position bottom edge of drainage board to be in moderate contact with weeping tile system.
- .2 Secure drainage board to foundation wall with nails and washers spaced 450 mm o/c horizontally. Install minimum of 2 rows staggered and spaced 150 mm apart and min 150 from top edge.
- .3 Align and install termination strip along top edge with nails spaced 300 mm o/c and seal with termination sealant.

- .4 Align and install moulding strip over completed top edge detail.
- .5 Overlap end laps, pull back loose fabric to expose drain core and position core of second panel over the overlap flange of first panel.
- .6 Bend drain board to create inside corners and cut board to create outside corners, provide 75 mm of extra fabric to wrap corner.
- .7 Stagger or offset joints of drain board sheets.
- .8 Place all subsequent sheets in an overlapping single fashion.
- .9 Backfill bottom edge in conjunction with weeping tile system.

3.9 APPLICATION

- .1 Do sealing work in accordance with CGSB 37-GP-11M except where specified otherwise.
- .2 Do priming of surface in accordance with CGSB 37-GP-15M except where specified otherwise.
- .3 Apply primer.

3.10 SCHEDULE

- .1 Apply continuous, uniform coating to walls adjacent sodded and plated areas from 50 mm below finished grade level to and including tops of foundation wall footings.
- .2 Apply continuous, uniform coating to exterior side of foundation walls enclosing rooms below finished grade. Include exterior portion of interior walls where floors in adjacent rooms are at different elevations.
- .3 Apply two additional coats of dampproofing to vertical corners and construction joints for a minimum width of 230 mm on each side, and all around and for 230 mm along pipes passing through walls.

3.11 CLEANING

- .1 Promptly as the work proceeds and on completion clean up and remove from site all rubbish and surplus materials resulting from the foregoing work.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 04 21 13 – Masonry.
- .3 Section 07 27 10 – Air Barriers.
- .4 Section 07 55 00 – Roof insulation.
- .5 Section 07 21 19 – Spray in Place Urethane Foam Insulation.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM E96-00e1, Test Methods for Water Vapour Transmission of Materials.
- .2 Canadian General Standards Board (CGSB).
 - .1 CGSB 71-GP-24M-77, Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .3 Underwriters Laboratories of Canada (ULC).
 - .1 CAN/ULC-S604-91, Type A Chimneys.
 - .2 CAN/ULC-S701-01, Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
- .4 Environmental Choice Program (EPC).
 - .1 CCD-016-97, Thermal Insulation.

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit two copies of WHMIS SDS - Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's insulation products and adhesives.
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material [n appropriate on-site bins for recycling.

Part 2 Products

2.1 INSULATION

- .1 Extruded polystyrene (XPS): to CAN/ULC-S701.
 - .1 RSI 2.65/R 15.
 - .2 Thickness: **75 mm** or as indicated on drawings.
 - .3 Edges: Ship lapped.
 - .4 For use on wall construction” below through-wall flashing below slab on grade or in composite foundation wall assembly, as shown typical foundation details,
 - .5 Acceptable Material: “**Styrofoam SM**” as manufactured by Dow Chemical Canada Inc.
 - .6 Acceptable Material: “**Foamular C300**” as manufactured by Celfortec Inc. (Owen Corning).
- .2 Extruded polystyrene (XPS): to CAN/ULC-S701.
 - .1 RSI 2.65/R 15.
 - .2 Thickness: **75 mm** or as indicated on drawings.
 - .3 Edges: Ship lapped.
 - .4 For use under slab on grade as shown typical foundation details,
 - .5 Acceptable Material: “**Styrofoam SM**” as manufactured by Dow Chemical Canada Inc.
 - .6 Acceptable Material: “**Foamular C300**” as manufactured by Celfortec Inc. (Owen Corning).

2.2 ADHESIVE

- .1 Adhesive (for polystyrene): to CGSB 71-GP-24.
 - .1 Bakor Air Bloc 21.
 - .2 Compatible with respective rigid insulation, air/vapour and waterproofing membranes and recommended by manufacturers of those products. Use Bakor 230-21 rigid insulation adhesive for rigid insulation in contact with Blueskin air vapour barrier.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 WORKMANSHIP

- .1 Install insulation after building substrate materials are dry.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.
- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN4-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 [type B] [and] [L] vents.
- .5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .6 Offset both vertical and horizontal joints in multiple layer applications.
- .7 Do not enclose insulation until it has been inspected and approved by Consultant.

3.3 EXAMINATION

- .1 Examine substrates and immediately inform Consultant in writing of defects.
- .2 Prior to commencement of work ensure:
 - .1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.4 RIGID PERIMETER FOUNDATION INSULATION INSTALLATION

- .1 Apply adhesive to polystyrene in accordance with manufacturer's recommendations.
- .2 Apply adhesive to insulation board by spot method with daubs 40 mm diameter x 25 mm high at 200 mm o.c. each way
- .3 Interior application: extend boards vertically below bottom of finish floor slab as indicated on drawings, installed on inside face of perimeter foundation walls.
- .4 Exterior application: extend boards below finish grade as indicated on drawings. Install on exterior face of perimeter foundation wall with adhesive.

- .5 Under slab application: extend boards as indicated on drawings. Lay boards on level compacted fill.

3.5 RIGID CAVITY WALL INSULATION INSTALLATION

- .1 System Comprised of:
 - .1 Specified thickness of rigid ship-lapped insulation on Henry-Bakor Blueskin SA air/vapour barrier.
 - .2 Henry-Bakor Airbloc 21 adhesive to be applied to all sides of insulation and continuous layer to all insulation surfaces in contact with air/vapour barrier. Butter all sides and back to ensure full air barrier integrity. Apply adhesive to polystyrene in accordance with manufacturer's recommendations
 - .3 Butter Air Bloc 21 at all brick tie penetrations to ensure a complete seal
 - .4 Install plastic LOC-Wedges at masonry veneer ties to ensure securement to structural wythe or back up wall and in full contact with air/vapour barrier on wall surfaces.

3.6 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 04 21 13 - Masonry.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 01 51 00 - Temporary Utilities.
- .4 Section 07 21 13 – Board Insulation.
- .5 Section 07 55 00 – Protected Membrane Roofing.
- .6 Section 07 62 00 – Sheet Metal Flashing & Trim.
- .7 Section 07 27 10 – Air Barriers.

1.2 REFERENCES

- .1 Canadian Urethane Foam Contractors' Association Inc. (CUFCA)
- .2 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S101, Fire Endurance Tests of Building Construction and Materials.
 - .2 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.
 - .3 CAN/ULC-S705.1, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Material Specification.
 - .4 CAN/ULC-S705.2, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Installer's Responsibilities-Specification.

1.3 TEST REPORTS

- .1 Submit test reports, verifying qualities of insulation meet or exceed requirements of this specification, in accordance with Section 01 45 00 - Quality Control.
- .2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

1.4 QUALITY ASSURANCE

- .1 Applicators to conform to CUFCA Quality Assurance Program.

1.5 SAFETY REQUIREMENTS

- .1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:
 - .1 Workers must wear protection gear when applying foam insulation.
 - .2 Workers must not eat, drink or smoke while applying foam insulation.

1.6 PROTECTION

- .1 Ventilate area in accordance with Section 01 51 00 - Temporary Utilities.
- .2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hour after application to maintain non-toxic, unpolluted, safe working conditions.
- .3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.
- .4 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling.
- .3 Fold up metal banding, flatten and place in designated area for recycling.
- .4 Dispose of waste foam daily in location designated by Consultant and decontaminate empty drums in accordance with foam manufacturer's instructions and CAN/ULC-S705.2.
- .5 Divert metal drums from landfill to metal recycling facility as approved by Consultant and to CAN/ULC-S705.2.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

Part 2 Products

2.1 MATERIALS

- .1 Insulation: spray polyurethane to CAN/ULC-S705.1.
 - .1 Density: 30.4 kg/m³ (1.9 lb/ft³) minimum.
 - .2 Compressive Strength: >185 KPa (per ASTM D1622)
 - .3 Tensile Strength: > 330 KPa (per ASTM D1623)
 - .4 Air Barrier Classification:
 - .1 Type III (NRC) - permeance: 0.02 L/sec/m² maximum at 75 Pa pressure differential.
 - .2 Air Barrier System Performance with leakage not exceeding 0.0054 l/m² @75 Pa pressure when tested in Accordance with CCMC Air Barrier System Requirements.

- .3 All manufacturers/applicators shall submit test data reports prior to acceptance.
- .5 Water Permeance: 125 ng/Pa.m².s @25mm specimen thickness.
- .6 Submit manufacturer's Safety Data Sheets in accordance with and Sections 013300 – Submittal Procedures and 013530 – Health and Safety.
- .7 Thickness: 100 mm
- .8 Acceptable material: Products meeting these specifications by BASF Canada Inc: "Walltite CMO1". Installation shall only be by applicators specifically approved by the manufacturer/distributor.
- .9 Acceptable material: Heatlok 0240, Heatlok Soya, Polar Foam 7300 and Polarfoam Soya, Elastochem Insulathane Extreme and Genyk Boreal Nature Elite.
- .10 Acceptable materials: products meeting or exceeding these specifications by CertainTeed Insulation Canada Inc. or other manufacturers meeting or exceeding these specifications as approved in writing by the Architect following specification and test data submission including CertaSpray Closed Cell Foam by CertainTeed Canada and Icynene MDC200 spray foam insulation.
- .11 Blowing agents must have a GWP of 150 or lower per Environment Canada Regulations effective January 1, 2021.
- .2 Primers: in accordance with manufacturer's recommendations for surface conditions.
- .3 Sheet Air/Vapour Barrier Transition Membrane and Thru-Wall Flashing:
 - .1 Self adhering SBS modified bitumen membrane reinforced with non-woven fibrous glass:
 - .1 Thickness: minimum 1.45 mm
 - .2 Water Vapour Permeance: 0.05 perms max value. (2.8 ng/Pa.m².s)
 - .3 Air Permeance: less than 0.01 l/m² at 75 Pa pressure differentials.
 - .4 Adhesion: 7 day min. Peel adhesion at 5 deg. C :
 - .1 to primed Concrete: > 20 N/cm
 - .2 to selfedge: > 20 N/cm
 - .3 to primed plywood: > 25 N/cm
 - .4 to metal: > 30 N/cm
 - .5 Submit manufacturer's Safety Data Sheets in accordance with and Sections 01333 – Submittal Procedures and 013520 – Health and Safety.
 - .6 Acceptable Material: Blueskin SA by Bakor and Blueskin TW as thru-wall transition at masonry locations.
 - .2 Overlap typically minimum 150 mm on all adjacent layers/materials or as detailed.

Part 3 Execution

3.1 APPLICATION

- .1 Apply insulation to clean surfaces in accordance with CAN/ULC-S705.2 and manufacturer's printed instructions. Use primer where recommended by manufacturer.

- .2 Apply sprayed foam insulation in thickness as indicated.

3.2 WORKMANSHIP

- .1 Certification
 - .1 Installation is to be only by certified CUFCA/NECA applicators and manufacturer of the product being applied. Applicator shall provide proof of both approvals.
- .2 Examination
 - .1 Install insulation after building substrata materials are dry, thoroughly clean and capable of providing a firm, uniform bonding surface and temperatures are within the range recommended by product manufacturers.
 - .2 Verify that surfaces and conditions are suitable to accept work required in this section.
 - .3 Report, in writing, defects in surfaces or conditions which may adversely affect the performance of products installed under this section to the Consultant; prior to commencement of work.
 - .4 Do not commence work until defects have been corrected.
- .3 Preparation-Sprayed Insulation:
 - .1 Mask and cover adjacent areas to protect from overspray.
 - .2 Apply primers for special conditions as required by foam manufacturer.
 - .3 Clean work area prior to commencing spray operations.
- .4 Preparation-Peel & Stick Membrane:
 - .1 Prime all surfaces using Blueskin Primer by Bakor or primer specifically approved by membrane manufacturer. Allow primer to dry. Apply primer only to areas to receive membrane within the same working day, or reprime surfaces.
- .5 Application-Sprayed Insulation:
 - .1 Apply insulation to clean surfaces in accordance with CAN/CGSB 51-39-92 and manufacturer's printed instructions. Use primer where recommended by manufacturer. Ensure full adhesion to transition membrane.
 - .2 Completely fill jambs of all hollow metal frames with insulation and ensure continuous contact with sheet membrane used at head of frames.
- .6 Application-Peel & Stick membrane:
 - .1 Ensure membrane widths capable of sealing to all door opens at heads of frames.
 - .2 Lap sides and ends a minimum of 100 mm or as per details. Ensure full adhesion as per details.
 - .3 Position membrane for alignment with release film in place. Roll back, remove release film and press firmly in place. Roll all areas and laps with a steel or polyurethane roller.
 - .4 Seal ends of membrane to substrate using Polybithume by Bakor. or product approved specifically by membrane manufacturer.
- .7 Tolerance

- .1 Maximum variation from required thickness for sprayed insulation: 6 mm.
- .8 Firestopping
 - .1 Required in all cavity walls 25 mm air space or greater.
 - .2 Install firestopping at 20 m intervals maximum horizontally and 3 m maximum vertically, in accordance with OBC requirements and manufacturer's approved method of Roxul AFB and transition membrane protection.
 - .3 At wall extending more than 1 storey in height, install additional firestopping horizontally at intermediate floor elevation.

3.3 LOCATIONS

- .1 Cavity Walls Above Grade: provide mineral wool horizontal and vertical fire stopping to perimeter of building cavity as required by OBC Division B.
- .2 In wall cavity, provide 450mm high band of rigid board insulation at the base of the wall cavity below the foamed in place insulation, to avoid sag and blocking of weep holes.
- .3 On all structural steel in concealed locations exterior to insulation wall assemblies where steel penetrates through thermal barrier of wall forming a "cold bridge, whether shown on drawings or not.
- .4 Concealed within Soffit Conditions: Refer to drawings.
- .5 Jambs of Hollow Metal Frames: Refer to Section 081115 – Door Schedule.
- .6 Behind Metal Siding/composite panels: Refer to Section 074143 – Aluminum Composite Panels.
- .7 All other miscellaneous locations to ensure integrity of a continuous air/vapour barrier and insulation layer.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation methods providing air vapour barrier materials and assemblies.
- .2 Air/vapour barrier materials to provide continuous seal between components of building envelope and building penetrations.

1.2 RELATED SECTIONS

- .1 Section 04 21 13 - Concrete and Clay Brick Unit Masonry Veneer
- .2 Section 07 21 13 – Rigid Board Insulation.
- .3 Section 07 44 56 – Composite Panels
- .4 Section 07 51 12 –Roofing.
- .5 Section 07 62 00 – Sheet Metal Flashing & Trim.

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13M-M87, Sealing Compound, One Component, Elastomeric Chemical Curing.
 - .2 CAN/CGSB-19.18M-M87, Sealing Compound, One Component, Silicone Base Solvent Curing.
 - .3 CAN/CGSB-19.24M-M90, Multi-Component, Chemical Curing Sealing Compound.
 - .4 CGSB 19-GP-14M-76, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
- .2 NBCC Part 5 - Environmental Separation
- .3 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's product data sheets in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Submit manufacturer's installation instructions in accordance with Section 01 33 00 - Submittal Procedures.

1.5 QUALITY ASSURANCE

- .1 Perform Work in accordance with Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification requirements for materials and installation.
- .2 Maintain one copy of documents on site.

1.6 QUALIFICATIONS

- .1 Applicator: Company specializing in performing work of this section with documented experience with installation of air/vapour barrier systems. Completed installation must be approved by the material manufacturer. .
- .2 Applicator: Company who is currently licensed by National Air Barrier Association or certifying organization must maintain their license throughout the duration of the project.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Deliver, store and handle materials in accordance with manufacture's written instructions.
- .3 Avoid spillage. Immediately notify Consultant if spillage occurs and start clean up procedures.
- .4 Clean spills and leave area as it was prior to spill.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Place materials defined as hazardous or toxic waste in designated containers.
- .2 Ensure emptied containers are sealed and stored safely for disposal away from children.

1.9 PROJECT ENVIRONMENTAL REQUIREMENTS

- .1 Do not install solvent curing sealants or vapour release adhesive materials in enclosed spaces without ventilation.
- .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
- .3 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.10 SEQUENCING

- .1 Sequence work to permit installation of materials in conjunction with related materials and seals.

Part 2 Products

2.1 SHEET MATERIALS

- .1 Refer to technical data sheets for physical properties of product.
- .2 Sheet Seal: Self-Adhesive bitumen laminated to high-density polyethylene film, nominal total thickness of 1 to 4 mm as indicated.
 - .1 Acceptable vapour impermeable membranes: Blueskin SA or Blueskin SA LT as manufactured by Henry Company or Sopraseal Stick 1100 T as manufactured by Soprema, use where the air barrier membrane, Air-Bloc 21 manufactured by Henry Company is not present.
 - .2 Adhesive: Blueskin adhesive or Aquatac Primer as manufactured by Henry Company or as recommended by alternate supplier manufacture. Sealant: 925 BES Sealant as manufactured by Henry Company or as recommended by alternate supplier manufacturer.
 - .3 Transition membrane adhesive to be Henry Air-Bloc 21.
 - .4 Air Barrier Membrane to be Henry Air-Bloc 21.

2.2 SEALANTS

- .1 Sealants in accordance with Section 07 92 10 - Joint Sealing.
- .2 Primer: Recommended by sealant manufacturer and Appropriate to application.
- .3 Substrate Cleaner: Non-corrosive type recommended by sealant manufacturer and compatible with adjacent materials.

2.3 ADHESIVES

- .1 Adhesive to be 'Air-Bloc 21' by Henry.

2.4 ACCESSORIES

- .1 Thinner and cleaner for as recommended by sheet material manufacturer.
- .2 Stick-Clips: Perforated Galvanized steel anchors.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept the Work of this section.
- .2 Ensure all surfaces are clean, dry, sound, smooth, and continuous and comply with air barrier manufacturer's requirements.
- .3 Report any unsatisfactory conditions to the Consultant in writing.
- .4 Do not start work until deficiencies have been corrected. Commencement of Work implies acceptance of conditions.

3.2 PREPARATION

- .1 Remove loose or foreign matter which might impair adhesion of materials.
- .2 Ensure all substrates are clean of oil or excess dust; all masonry joints struck flush, and open joints filled; and all concrete surfaces free of large voids, spalled areas or sharp protrusions.
- .3 Ensure all substrates are free of surface moisture prior to application of self-adhesive membrane and primer.
- .4 Ensure metal closures are free of sharp edges and burrs.
- .5 Prime substrate surfaces to receive adhesive and sealants in accordance with manufacturer's instructions.

3.3 INSTALLATION

- .1 Install materials strictly in accordance with manufacturer's instructions.
- .2 Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

3.4 PROTECTION OF WORK

- .1 Protect finished Work in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Do not permit adjacent work to damage work of this section.
- .3 Ensure finished Work is protected from climatic conditions.

3.5 SCHEDULES

- .1 Wall Air/Vapour Barrier Over Outer Surface of Inner Wythe of Masonry: Trowel seal Type F over masonry unit surface to a thickness of 6 mm, seal masonry anchor penetrations airtight.
- .2 Wall Air/Vapour Barrier over Exterior Surface of Gypsum Sheathing: Place sheet seal Type G over sheathing surfaces with Adhesive Type E. Seal with Type Y sealant.
- .3 Window Frame Perimeter: Lap sheet seal Type H from wall air seal surface with 75 mm of full contact over firm bearing to window frame with 25 mm of full contact. Edge seal with Type Z sealant.
- .4 Wall and Roof Junction: Lap sheet seal Type J from wall seal material with 150 mm of contact over firm bearing to roof air seal membrane with 100 mm of full contact. Seal with Type X sealant.
- .5 Roof System Air/Vapour Barrier Over Steel Deck: Gypsum sheathing, taped joints, apply membrane air seal Type K over sheathing surfaces with Adhesive Type D; edge seal membrane with Type Y sealant.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 07 27 10 – Air Barriers.
- .3 Section 07 21 13 – Board Insulation.
- .4 Section 05 50 00 - Metal Fabrications.
- .5 Section 07 44 56 – Composite Panels.

1.2 REFERENCES

- .1 American Association (AA)
 - .1 DAF-45-03, Designation System for Aluminium Finishes.
- .2 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
- .3 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A653/A653M-02a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A792/A792M-02, Specification for Steel Sheet, 55% Aluminium-Zinc Alloy-Coated by the Hot-Dip Process.
 - .3 ASTM D523-89, Test Method for Specular Gloss.
 - .4 ASTM D822-01, Standard Practice, For Conducting Test on Paint and Related Coatings and Materials Using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
 - .5 ASTM D2832-92, Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-93.1-M85, Sheet, Aluminium Alloy, Prefinished, Residential.
- .5 Canadian Standards Association (CSA International)
 - .1 CSA S136-01, North American Specification for the Design of Cold-Formed Steel Structural Members.
 - .2 CSA S136.1-01, Commentary on North American Specification for the Design of Cold-Formed Steel Structural Members.
- .6 Environmental Choice Program (ECP)
 - .1 CCD-016, Thermal Insulation.
 - .2 CCD-046, Adhesives.
 - .3 CCD-046, Sealants and Caulking Compounds.

1.3 SYSTEM DESCRIPTION

- .1 Design Requirements:
- .2 Design, fabricate and erect a pressure equalized wall panel system to meet the following requirements.
 - .1 Rain Penetration: prevent rain penetration through wall system. Design system based on “Rain Screen Principle” per the National Research Council. Incorporate means of draining to the exterior.
 - .2 Wind load: Design wall system to resist wind loads, positive and negative, expected in this geographical region (OBC climatic data, 100 years probability) without causing rattling, vibration or excessive deflection of panels, overstressing of fasteners, clips and other detrimental effects on system.
 - .3 Structural and thermal movement: Accommodate movement of supporting structural framing and movement caused by thermal expansion and contraction of system component parts without causing bowing, buckling, delamination, oil canning, failure of joint seals, excessive stress on fasteners or any other detrimental effects.
- .3 Panel flatness tolerance: Fabricate panels not exceeding the following tolerances:
 - .1 Rises and falls across the panel, (local bumps and depressions) will not be accepted.
 - .2 1.5 mm in a concave/ convex direction, measured perpendicular to the normal plane.
- .4 Panel removal: System/ procedure to allow removal of individual panels within wall system.
- .5 Maximum deviation from vertical and horizontal alignment of erected panels: 6 mm in 6 m.
- .6 Testing: Provide wall assembly that has been tested and certified to conform to the following criteria:
 - .1 Structural: Provide systems that have been tested in accordance with ASTM E330 at a design pressure of 60 psf and have been certified to be without permanent deformation or failures of structural members.

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate elevations, profiles, dimensions and thickness of panels and joint details.
 - .3 Indicate attachment clips, system extrusions, fastening, anchor and installation details.

- .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit duplicate 130 x 180 mm samples of wall system, representative of materials, finishes and colours.
- .4 Production and Installation Schedule:
 - .1 Meeting the required schedules listed below will be required for approval of progress payments for design and fabrication.
 - .2 As part of base contract price, upon award of contract submit a detailed schedule with the shop drawing which outlines:
 - .1 submission timing of shop drawings
 - .2 fabrication timing from date of approved shop drawings
 - .3 building completion requirements for site measurements
 - .4 Duration of installation period
 - .5 dates required for installation program for work to be 100% complete by date of substantial completion
 - .3 Ensure the program for fabrication and installation is integrated into the General Contractor's overall project schedule.
 - .4 As part of base contract price, attend site meetings commencing 6 weeks prior to installation and through installation period to confirm site progress and timing of completion.
- .5 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.5 MAINTENANCE DATA

- .1 Provide maintenance data for cleaning and maintenance of aluminum finishes for incorporation into manual.
- .2 Protect panel face with a plastic film adhered to panel in accordance with panel manufacturer's recommendation.
- .3 Store components and materials in accordance with panel manufacturer's recommendations.

1.6 MOCK UP

- .1 Submit mock-up in accordance with Section 013330- Submittal Procedures.
- .2 Erect mock-up panel approximately 3m long x 2m high in location as directed by architect.
- .3 Mock-up panel shall include all components of the wall system including subgirt flashing. Mock up will NOT be incorporated into work once approved.
- .4 Remove mock up from site following installation and acceptance of panel system.

1.7 DURANAR PANEL FINISH WARRANTY

- .1 Provide a manufacturer's written warranty: Furnish panel manufacturer's written warranty covering failure of factory-applied exterior finish on composite metal panels within the warranty period; warrant finish per ASTM D 4214 for chalk not in excess of 8 NBS units and fade not in excess of 5 NBS units. Warranty period for finish: 10 years after the date of Substantial Completion.

1.8 QUALITY ASSURANCE

- .1 Installation crews engaged or provided by the approved supplier shall have proven experience specifically trained and qualified in this work (written proof of minimum of five (5) years employment or service with the panel manufacturer or similar manufacturer. Individuals are to be either employees of the manufacturer and/or workers approved by the manufacturer.
- .2 Provide one (1) thoroughly experienced, reliable, qualified and competent foreman in charge of the work to be on site at all times when work is taking place. Individual to be designated in charge from start of activities on site until final deficiencies are complete. Foreman may only be changed by written approval *or request* of the Consultant or School Board.
- .3 Panel fabricator/supplier is to have adequate plant and skilled tradesmen and is known to have manufactured and installed panel systems for a minimum of five (5) years in the Province of Ontario

1.9 MATERIAL AND WORKMANSHIP WARRANTY

- .1 Warranty against defects or deficiencies shall be for a period of one year from date of substantial completion.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material [in appropriate on-site] bins for recycling.
- .3 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .4 Divert unused paint and joint sealer material from landfill to official hazardous material collections site approved by Consultant.
- .5 Do not dispose of unused paint and joint sealer materials into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

- .1 Aluminum Composite Material (ACP)
 - .1 Pre-formed aluminum composite panels in locations as indicated on drawings.
 - .2 Composition: Two sheets of aluminum sandwiching a core of extruded thermoplastic formed in a continuous process without the use of glues or adhesives between dissimilar materials. Bond integrity testing to adhere to ASTM D1781-76
 - .3 Aluminum face sheets: Aluminum alloy 3003, thickness: 0.51 mm
 - .4 Panel thickness: 4 mm
 - .5 Panel weight: 5.28 kg/sq.m.
 - .6 Tolerances:
 - .1 Panel bow: Maximum 0.8% of panel dimension (width or length).
 - .2 Panel Dimensions: Take site measurements before proceeding with production unless dimensions can be guaranteed by General Contractor.
 - .3 Panel lines, breaks and angles to be sharp and true; panel surfaces to be free from warp or buckle.
 - .7 Panel System: Dry joint SL-2000 with 12.5 mm wide panel joints using proprietary aluminum extrusions.
 - .8 Aluminum Composite to have a fire-resistant core, meeting OBC requirements for non-combustible materials.
 - .9 Acceptable materials and manufacturers:
 - .1 Alucobond Plus, Alpolic; Kanalco Ltd., Flynn Canada, Alcotex or others meeting the exact fire rated and compositional requirements of this specification and having colours and 'wood grain look' options to the satisfaction of the architect.
- .2 Panel finishes: Duranar, three coat, coil-coated baked enamel finish containing Kynar 500 polyvinylidene fluoride resin, metallic finish as specified below.
- .3 Panel Colours: Allow for 3 colours:
 - .1 **Aluminum Composite Panel Colour 1:** Grey. Exact colour to be selected by consultant from manufacturer's full colour range, including metallic series.
 - .2 **Aluminum Composite Panel Colour 2:** Blue. Exact colour to be selected by consultant from manufacturer's full colour range, including metallic series.
 - .3 **Aluminum Composite Panel Colour 3:** 'Wood Grain' pattern in light wood tone. Exact colour to be selected by consultant from manufacturer's full colour range.
 - .4 Locations: Wall panels, Canopy soffits and fascias as noted on drawings.
 - .5 Contractor to submit triplicate samples of colours for review by Consultant prior to order and fabrication.

.4 Panel and Wall Accessories

- .1 Provide proprietary aluminum extrusions to manufacturer's standard profiles for a complete installation.
- .2 Provide aluminum integrated roof parapet cap flashing where indicated on drawings.
- .3 Fasteners: as recommended by panel manufacturer, concealed and non-corrosive.
- .4 Extrusions and extrusion clips for attaching panels to the sub-structure: Purpose made aluminum.
- .5 Extrusions shall be full length around panel perimeter for panel reinforcement and alignment. Intermittent clips are unacceptable.
- .6 Joint filler strip: Same material and color as panels. Use of caulking at joints is not acceptable.
- .7 Plastic shims, shall be used as thermal separator between extrusions and sub-girts.
- .8 Sub-girts: To be manufactured from G-90 galvanized steel and shall be designed to accommodate expansion and contraction, dynamic movements and design load requirements.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 PREPARATION

- .1 Protect metal surfaces in contact with concrete, masonry mortar, plaster or other cementitious surface with isolation coating.

3.3 INSTALLATION

- .1 Wall Panel System:
 - .1 Before proceeding, examine work of other sections upon which this section depends.
 - .2 Sub-girts: Prior to installation of insulation air vapour barrier under Section 072710- Air Barriers erect subgirts fastened to masonry wall in accordance with system manufacture's installation instructions. Ensure that all penetrations through air/ vapor barrier are sealed.
 - .3 After installation of insulation/ air vapour barrier under Section 072710 – Air Barriers and Section 072113 – Board Insulation, erect panels and joint filler strip in accordance with manufacturer's details to meet specified design criteria and performance.
 - .4 Finished work shall be securely anchored, free of distortion, free of surface imperfections and uniform in colour.
 - .5 Use concealed fastenings only.

- .6 Install panels plumb, true, level and in alignment to established lines and elevations.

3.4 CONTROL/EXPANSION JOINTS

- .1 Construct control and expansion joints where required or as indicated.
- .2 Use cover sheets, of brake formed profile, of same material and finish as adjacent material.
- .3 Use mechanical fasteners to secure sheet materials.
- .4 Assemble and secure wall system to structural frame so stresses on sealants are within manufacturers' recommended limits.

3.5 FIELD QUALITY CONTROL

- .1 Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its product[s], and submit written reports in acceptable format to verify compliance of Work with Contract.
- .2 Manufacturer's field services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .3 Manufacturer to schedule site visits to review Work at stages listed:
 - .1 After delivery and storage of products, and when preparatory Work on which Work of this Section depends is complete, but before installation begins.
 - .2 Three times during progress of Work: at start up, at 25% and 70% complete.
 - .3 Upon completion of Work, after cleaning is carried out.
- .4 Obtain reports within three days of review and submit.

3.6 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Wash down exposed interior and exterior surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths. Wipe interior surfaces clean as part of final clean-up.
- .3 Remove excess sealant with recommended solvent.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .5 Remove protective plastic film from panels.
- .6 Repair and touch-up with colour matching high grade enamel minor surface damage.
- .7 Replace damaged panels and components which cannot be satisfactorily repaired.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Requirements for the installation of preformed metal cladding/siding.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 06 10 11 – Rough Carpentry.
- .3 Section 04 21 13 – Masonry.
- .4 Section 07 21 19 – Sprayed in Place Urethane Foam Insulation.
- .5 Section 07 21 13 – Rigid Board Insulation
- .6 Section 07 41 43 – Aluminium Composite Panels.

1.3 REFERENCES

- .1 American National Standards Institute (ANSI).
 - .1 ANSI B18.6.4-99, Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws.
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM D2369-03, Test Method for Volatile Content of Coatings.
 - .2 ASTM D2832-92, Guide for Determining Volatile and Non-volatile Content of Paint and Related Coatings.
 - .3 ASTM D5116, Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-51.32 Sheathing, Membrane, Breather Type.
 - .2 CAN/CGSB-93.2, Prefinished Aluminium Siding, Soffits and Fascia, for Residential Use.
 - .3 CGSB 93.5, Installation of Metal Residential Siding, Soffits and Fascia.
- .4 Canadian Standards Association (CSA International).
 - .1 CSA B111, Wire Nails, Spikes and Staples.
- .5 Environmental Choice Program (ECP).
 - .1 CCD-045, Sealants and Caulking Compounds.
- .6 Underwriters' Laboratories of Canada (ULC).
 - .1 CAN/ULC-S706, Wood Fibre Thermal Insulation for Buildings.

1.4 SUBMITTALS

- .1 Shop Drawings:

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate arrangement of sheets and joints, types and locations of fasteners and special shapes and relationship of panels to structural support members or support wall.
- .3 Clearly detail and indicate locations of all Z clips, J-closures and edge trims.
- .4 Describe in shop drawing details, suitable accommodation for the removal and joining of future cladding as described in 1.2.7 of this section and on drawings.
- .2 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit duplicate 300 x 300 mm samples of siding material, of colour and profile specified.
- .3 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert used metal cut-offs from landfill by disposal at the nearest metal recycling facility.
- .2 Divert reusable materials for reuse at nearest used building materials facility.
- .3 Divert unused caulking, sealants, and adhesive materials from landfill through disposal at hazardous material depot.

1.6 EXTENDED WARRANTY

- .1 Submit a warranty for metal siding system, covering materials and labour and the repair or replacement of defective work in accordance with the Contract, but for five (5) years total.

Part 2 Products

2.1 'WOOD LOOK' METAL SIDING (for soffit)

- .1 Metal Siding (Soffit) (wood effect):
 - .1 Longboard by Mayne Coatings Corp., Langley, BC
 - .2 Location: Exterior siding (various locations) and soffits.
 - .3 150mm (6") Channel Siding & Soffit.
 - .4 Colour: Wood effect. Exact shade to be selected from manufacturer's full range.
 - .5 Approved extruded aluminum only alternates with similar profile, woodgrain pattern and shade, including Knotwood, Luxyclad, AL13 Architectural System and Dizal.

- .2 For copings and flashings, provide prefinished metal 24 gauge thickness, colours as specified in Section 076200- Sheet Metal Flashing and Trim.
- .3 For metal framing refer to Contract Drawings.
- .4 Provide 'ISO Clips' (thermal isolation clips) as manufactured by Northern Facades, or approved equivalent. Provide at all connection locations to reduce thermal bridging.
- .4 Screws: to CSA B35.3-1962, any exposed fasteners to have head color same as exterior sheet finish, dish to CSA B35.3-1962.
- .5 Powder actuated fasteners: galvanized, peened ballistic point, plastic cap of same color as exterior sheet.
- .6 Sealants: in accordance with Section 079210- Joint Sealers, colour selected by Consultant. Allow for one (1) colour from manufacturers full range to match adjacent metal.
- .7 Gaskets: soft pliable arctic grade vinyl, extruded profile.
- .8 Touch-up paint: as recommended by panel manufacturer and Baycoat, compatible with prefinished coating.
- .9 Provide purpose made material separators between dissimilar metal materials to avoid corrosion.
- .10 Isolation coating: alkali resistant bituminous paint or epoxy resin solution.
- .11 Insulation: As noted on Drawings and in Section 072113 – Board Insulation, and sections pertaining to Insulation and Sheet Air/Vapour Barrier transition membrane.

2.2 COMPONENTS

- .1 Exterior sheet: factory preformed coated metal, to profiles and thicknesses as indicated.
- .2 Exterior corners: of same profile, material and finish as adjacent siding material, shop cut and brake formed to required angle, concealed corner brace, hairline exposed joint, pop rivet connections with painted head to match siding.
- .3 Exposed joint ends of siding sheet shop cut clean and square, backed with tight fitting filler lapping back if joint, exposed components color matched to siding.
- .4 Accessories: cap flashings, drip flashings, internal corner flashings, copings and closures for head, jamb, eaves, soffits sill and corners, of same material and finish as exterior siding, brake formed to shape. Exposed cut edges of metal profiles will not be accepted.
- .5 Sub-girts: zinc coated to ASTM A525-78a, G90 coating designation, profile as indicated to accept exterior sheet with structural attachment to building frame.

2.3 FASTENERS

- .1 Nails: CSA B111. Screws: ANSI B18.6.4.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

- .1 Install cladding in accordance with CGSB 93.5, and manufacturer's written instructions
- .2 Install sub-girts to masonry walls prior to the installation of the Urethane foam insulation
- .3 Install exterior finish siding to internal sub-girts with concealed fasteners.
- .4 Provide notched and formed closures, sealed to arrest direct weather penetration at vertical profiles for exterior siding. Ensure continuity of "pressure equalization" of rain screen principle.
- .5 Provide alignment bars, brackets, clips, inserts, shims as required to securely and permanently fasten wall system to building structure.
- .6 Supply and install flashing at connection between roof and preformed metal siding.

3.3 CONTROL JOINTS

- .1 Construct control joints, as indicated.
- .2 Use cover sheets, of brake formed profile, of same material and finish as adjacent material.
- .3 Use mechanical fasteners to secure sheet Expansion Joints materials.
- .4 Assemble and secure wall system to structural frame so stresses on sealants are within manufacturer's recommended limits.

3.4 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .2 Wash down exposed surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.
- .3 Remove excess sealant with recommended solvent.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 This Section specifies general requirements and procedures for modified bituminous roofing (conventional). Additional requirements may be specified in individual Sections of the Specification.
- .2 All conditions of the Contract and Division 1 apply to this Section.
- .3 Coordinate Work of this Section with related Work specified in other Sections to ensure construction schedule and protection of finished Work is maintained at all times.
- .4 Contractor to provide an original, complete insurance policy identifying specific coverage for torch applied systems.

1.2 DESCRIPTION OF WORK

- .1 Complete all Work as specified in the Summary of Work, Specification and Drawings.
- .2 Work of this Section includes the supply and installation of Modified Bituminous Roofing.
- .3 Review the extent of the Work with the Consultant on site before proceeding.
- .4 Work “as described” is held to include all incidental items that by implication, good trade practices, or customary usage are required to complete the Work, even though they may not be specifically mentioned or shown.
- .5 Additional requirements may be specified in individual Sections of the Specification and/or shown on the Drawings.

1.3 RELATED WORK

- .1 Roofing Specification is comprised of the following:
 1. Section 07 50 13 – Common Work Results for Roofing
 2. Section 07 50 16 – Wood Blocking for Roofing
 3. Section 07 50 19 – Sealants for Roofing
 4. Section 07 51 00 – Built-Up Bituminous Roofing
 5. Section 07 62 13 – Sheet Metal for Built-Up Roofing
 6. Sections 22 00 00 - & 23 00 00 – Mechanical
 7. Section 26 00 00 – Electrical

1.4 REFERENCES

The latest edition of all Standards shall apply if the referenced standards have been superseded.

Primers and Paint:

- | | | |
|----|-------------------|--|
| .1 | CGSB 37-GP-9Ma-83 | Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing. |
| .2 | CGSB 37-GP-15M-84 | Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing. |

Thermal Barrier, Adhesives and Tapes:

- | | | |
|----|----------------------|--|
| .3 | ASTM C1396/C1396M-04 | Standard Specification for Gypsum Board.
(Supersedes CSA A82.27-M and ASTM C36/C36M-03) |
|----|----------------------|--|

Vapour Barriers and Air Seals:

.4 CAN/CGSB-51.33-M89

Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

Insulations:

.5 ASTM C726-05

Mineral Fiber Roof Insulation Board.

.6 ASTM C728-05

Perlite Thermal Insulation Board.

.7 CAN/ULC-S126-M86

Fire Spread Under Roof-Deck Assemblies.

.8 CAN/ULC-S701-05

Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.9 CAN/ULC-S702-97

Thermal Insulation, Mineral Fibre for Buildings.

.10 CAN/ULC-S704-03

Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

.11 CAN/ULC-S705.1-01

Thermal Insulation - Spray Applied Rigid Polyurethane Foam.

.12 CAN/ULC-S705.2

Thermal Insulation - Spray Applied Rigid Polyurethane Foam.

.13 CAN/ULC S706-02

Wood Fibre Thermal Insulation for Buildings.

.14 CAN/ULC S770-03

Determination of Long-term Thermal Resistance (LTTR) of Closed-Cell Thermal Insulating Foams.

Asphalts and Bitumens:

.15 CAN/CSA A123.4-04

Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.

Felts and Membranes:

.16 ASTM D173-03

Bitumen-Saturated Cotton Fabrics Used in Roofing and Waterproofing.

.17 ASTM D1970-01

Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

.18 CAN/CSA-A123.3

Asphalt Saturated Organic Roofing Felt.

.19 CSA A123.17 and

Asphalt Glass Felt Used in Roofing and Waterproofing.

ASTM D2178-97a-05

.20 CAN/CGSB-37.54-95

Polyvinyl Chloride Roofing and Waterproofing Membrane.

.21 CGSB 37-GP-56M-85

Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

.22 CGSB 37-GP-64M-77.

Mat Reinforcing, Fibrous Glass, for Membrane Waterproofing Systems and Built-Up Roofing.

Miscellaneous Roofing Sealants and Adhesives:

.23 CAN/CGSB 37.29-M-89

Rubber-Asphalt Sealing Compound.

Miscellaneous Fixtures:

.24 CAN/CGA-8.1-M86

Elastomeric Composite Hose and Hose Couplings for Conducting Propane and Natural Gas.

Fasteners:

.25 ASTM A153/A153M-05

Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.26 ASME B18.6.1

Wood Screws (Inch Series).

.27 ASME B18.6.4

Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws, Inch Series.

.28 CSA B111

Wire Nails, Spikes and Staples.

.29 CAN/CSA-G164-M92

Hot Dip Galvanizing of Irregularly Shaped Articles.

Aggregates and Pavers:

.30 ASTM D1863-03

.31 CSA A231.1-99

Mineral Aggregate Used on Built-Up Roofs.

Precast Concrete Paving Slabs.

1.5 QUALIFICATIONS

- .1 Employ only experienced and qualified workers that can provide quality results. Replace all Work that results from inferior products or installation.

1.6 EXAMINATION

- .1 Examine surfaces and report any adverse conditions that could negatively impact the appearance and performance of the Work.

1.7 COORDINATION

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

1.8 SPECIFICATION

- .1 Work of this Section includes new roofing system installation including all relative Work shown on the Drawings. Provide a complete roofing, insulation, flashing and air/vapour barrier system.
- .2 Provide temporary drains and provide seals as required to make drains watertight. Remove and replace air seals and raise drain to elevations dictated by design intent before proceeding with roofing operation.
- .3 Work “as described” is held to include all incidental items that by implication, good trade practice, or customary usage are required to complete the Work even though they may not be specifically mentioned or shown.

1.9 GENERAL REQUIREMENTS

- .1 Comply with the General Requirements, General Instructions and Supplementary Conditions.
- .2 Execute Work in accordance with Specification, Drawings and Details.
- .3 Anchor roofing to meet requirements of Insurance Underwriter and Authorities having jurisdiction.
- .4 Regard Manufacturer’s printed recommendations as minimum requirement for materials, methods and workmanship not otherwise specified.
- .5 Contact the Consultant if the specifications conflict with the Manufacturer’s recommendations. Otherwise it will be assumed that the Contractor and Manufacturer are in agreement with procedures outlined.
- .6 Advise the Consultant of adjustments to specified roofing procedures recommended by Manufacturer’s caused by weather and site conditions. Make adjustment to specified procedures only after review with the Consultant.
- .7 Lay out Work to avoid working over newly installed felts. If any foreign material is inadvertently incorporated into the membrane, remove the material immediately and repair to restore membrane to its original integrity.

- .8 Maintain equipment in good working order to ensure control of roofing operations and protection of Work. Types of roofing equipment and laying techniques to be employed are to meet the approval of the Consultant.
- .9 Do not penetrate roof deck with any fastening devices that would do damage or impair the function of the assembly.

1.10 ENVIRONMENTAL REQUIREMENTS

- .1 Install products sensitive to damage by moisture, snow or fog only when weather permits.
- .2 Protect any unfinished Work that can be damaged by weather.
- .3 Ensure protection of the building from weather at all times
- .4 If inclement weather is forecast or appears imminent, postpone Work that would risk the Work or building being damaged by moisture.
- .5 As governed by design intent, apply each part of roofing system only when surfaces and weather allow for a successful application and performance of completed Work.
- .6 Observe minimum temperature and weather conditions set out in Manufacturer's printed recommendations. Only proceed with Work when temperatures are below 5°C (40°F) with the mutual documented agreement between the Roofing Contractor and material supplier that, with the materials and method used, the specified installation under the conditions can be successfully achieved.
- .7 Postpone installation of roof membrane or membrane flashings when temperatures, including wind chill, have fallen below -26°C (-15°F).
- .8 If it becomes apparent that Work would threaten the buildings water tightness, the School Board has the right to stop Work. Any additional expenses due to Work stoppage or postponement of Work will be at the Roofing Contractor's expense.

1.11 HEALTH AND SAFETY REQUIREMENTS

- .1 The Contractor shall comply with the requirements as provided in the Hot Work and Safety Checklist where welding, soldering or torching on the roof is to take place.

1.12 OPEN FLAME AND FIRE SAFETY

- .1 Appoint a Fire Watch where welding, soldering or torching on the roof is to take place.
- .2 Fire Watch shall be knowledgeable and must have successfully completed the Canadian Roofing Contractors Association (CRCA) National Torch Safety Program, provincial affiliate or member Manufacturer equivalent.
- .3 Fire Watch shall be knowledgeable and trained in identifying and minimizing fire hazards, in propane safety, and in the proper use of fire extinguishers.
- .4 Maintain surveillance for a minimum of 2 hours after the completion of torching operation, after which an inspection of the area is to be made.
- .5 Maintain extinguishers to requirements of IAO (Insurer's Advisory Organization) and Ontario Building Code Article 3.2.5.6 and NFPA #10 (National Fire Protection Association).Environmental Requirements

1.13 WELDING

- .1 Welding must conform to the latest issue of CSA W59-03.

- .2 All Sub-Contractors undertaking to weld must be fully approved by the Canadian Welding Bureau under the latest requirements of CSA W47.1-03.

1.14 ROOFING KETTLES AND MOPS

- .1 Use kettles that are in good working order, have tight fitting lids and equipped with accurate thermometers or gauges to prevent overheating of the bitumen that could otherwise pose a fire threat.
- .2 Locate kettles in a safe place outside of the building that avoids the possibility of ignition of combustible material.
- .3 Maintain continuous supervision while kettles are in operation and provide metal covers for the kettles to smother any flames in case of fire.
- .4 Disconnect propane burners from heating containers when not in use. Store propane in protected area away from ignition sources and buildings. Contact local Fire Chief and advise of Work in progress. Act on instructions given to render the site free of fire hazards.
- .5 Use only glass fibre roofing mops. Do not leave used roofing mops on the roof unattended. Store mops away from the building and combustible materials. Remove from site daily.
- .6 Supply and maintain in good working order, ABC fire extinguishers with a minimum of 4.5 kg (10 lbs) capacity at the kettle and at each location where Work is in progress including at ground level, kettles and tankers. Keep extinguishers in locations away from propane tanks. A separate fire extinguisher must be provided to the Fire Watch.

1.15 ADDITIONAL FIRE SAFETY REQUIREMENTS

- .1 All workers must comply with procedures set out in the Health and Safety Guidelines for Low Slope Roofing, Construction Safety Association of Ontario.
- .2 All workers using a propane torch must have successfully completed the Canadian Roofing Contractors Association (CRCA) National Torch Safety Program provincial affiliate or Manufacturer's equivalent.
- .3 All workers must be trained in identifying and minimizing fire hazards and in propane safety and must comply with the procedures as set out in the Membrane Manufacturer's literature and/or the National Torch Safety Program.

1.16 PROTECTION OF WORK AND PROPERTY

- .1 Provide protection to allow for normal building operations during Work of this Contract.
- .2 Close off area; provide warning signs and safety barricades and/or scaffolding to protect motor vehicle and/or pedestrian traffic. When working overhead, including hoisting and replacing electrical or mechanical equipment or damaged deck, provide safety inspectors or flag operators using two-way radios to control traffic flow.
- .3 When interior protection is required, coordinate the Work with the School Board.
- .4 Protect the Work, building and property from damage. Provide tarpaulins and minimum 12.5 mm (0.5") plywood sheets in hoisting, pumping and set-up areas to prevent damage and staining of surfaces.
- .5 Protect landscaping and paving adjacent to kettles and areas where chopping of bitumen will take place, by installing minimum 12.5 mm (0.5") plywood sheets under and adjacent to all areas that may be impacted by the operation.

- .6 Prevent damage to landscaping by installing minimum 50 mm (2") thick wood planks continuously under tankers, dolly wheels of trailer, and disposal bins.
- .7 Cover openings and joints in deck to prevent dust, moisture or construction materials from entering the building.
- .8 Close doors leading to construction areas for security reasons and to prevent dust, water or fumes from entering the building.
- .9 Protect roofs and flashings in hoisting, dumping and traffic zones with 9.5 mm (0.375") plywood sheets. Underlay plywood sheets with 10-mil polyethylene when working over new bituminous membrane. Remove plywood when not in use; otherwise weigh down to prevent removal by wind.
- .10 Provide temporary plumber's plugs to protect drains during roofing operations. General Contractor is responsible for daily removal of the temporary plumbing plug and must coordinate Work with the Mechanical Contractor.
- .11 If in the performance of the Work it becomes apparent that proper protection is not being provided and the Roofing Contractor's Work is disrupting building or site, the School Board has the right to stop Work until the problem or conditions are rectified. Any cost due to the stoppage or postponement of Work will be the Roofing Contractor's responsibility.

1.17 MANUFACTURER'S INSTRUCTIONS

- .1 Regard Manufacturer's printed recommendations as minimum requirements for materials, methods and workmanship not otherwise specified. Do not rely solely on labels or enclosures provided with products. Submit one copy and keep one copy of Manufacturer's instructions available on the site for each product used in the Work.
- .2 Contact the Consultant if the specifications conflict with the Manufacturer's recommendations. Otherwise, it will be assumed that the Roofing Contractor and Manufacturer are in agreement with procedure outlined.
- .3 Advise the Consultant of adjustments to specified roofing procedures recommended by Manufacturer's due to weather and site conditions. Make adjustments to specified procedures only after review with the Consultant.
- .4 If installation or erection of products does not comply with the requirements, the Consultant is authorized to request removal and re-installation at no increase in the Contract Price.

1.18 IDENTIFICATION AND DELIVERY

- .1 Materials and equipment shall be delivered and stored to the site undamaged and in their original packaging, with Manufacturers seals and labels intact and visible, attesting to their conformity to specific standards.
- .2 Provide bill of lading for bulk loads of bitumen clearly showing Equiviscous Temperatures (EVT), Flash Point (FP) and Final Blowing Temperature (FBT).
- .3 Ensure that shelf life of materials has not expired.
- .4 Prevent damage, adulteration and soiling of material and equipment during delivery, handling and storage.
- .5 Inspect insulation for physical and moisture damage, size, cupping, bowing and edge cavitations. Mark defective material with spray paint to ensure it is not incorporated into roofing system.

- .6 Remove damaged or rejected material from site and replace with new product.
- .7 Touch-up damaged factory-finished surfaces on equipment to the Consultant's satisfaction. Use primer or enamel to match original. Do not paint over nameplates.

1.19 COMPATIBILITY

- .1 Compatibility between components of the system and adjacent materials is essential. Use only materials that are known to be compatible when incorporated in a completed assembly. Notify the Consultant in writing when the materials and components of the assembly do not meet this requirement.
- .2 Defective Work resulting from Work with incompatible materials will be considered the responsibility of the Roofing Contractor.
- .3 Repair all Work that could result in damage or interfere with performance.

1.20 STORAGE AND HANDLING

- .1 Manufacturer's recommendations for handling and storing products are to be considered a minimum requirement.
- .2 Do not store material on roof.
- .3 If insulation or other roofing products are shipped to the site in plastic wrap, cut or remove wrap. Keep material covered with waterproof, breathable covering and protect stored materials from moisture and degrading effects of the sun.
- .4 Elevate on raised platform a minimum of 100 mm (4") high and store as to prevent deformation of materials. Remove only those required for current day's operation.
- .5 At temperatures below 4°C (40°F), store membrane roofing, adhesive and sealants that will be affected by temperature in dry heated storage. Only remove product immediately prior to installation.
- .6 Protect temperature sensitive materials and products such as adhesives from cooling on the roof by providing temporary shelter or hotbox.
- .7 Protect edges of all rolled goods. Stand on end to prevent deformation. Do not store more than one skid high.
- .8 Remove and replace all wet or damaged materials.
- .9 Do not store aggregate on roof. Keep covered during inclement weather. Heat to dry by acceptable method prior to installation.

1.21 EXAMINE EXISTING CONDITIONS

- .1 Before proceeding with roofing installation, examine existing conditions and inspect substrate surfaces and verify that:
 - .1 Surfaces are free of debris, contamination, snow, frost and moisture.
 - .2 The deck is clean, smooth and sufficiently dry to ensure specified adhesion will be obtained.
 - .3 Adjacent construction and installation of related Work (i.e. curbs, drain openings, penetrations, wood nailers, etc.) is complete.
 - .4 Roof deck is sound, existing fasteners are tight and deck irregularities are corrected to provide a suitable surface for new roofing.
 - .5 Sharp edges or protrusions that could impair the function of the roof assembly are removed.

- .2 Notify Consultant of any adverse conditions to Section (07 50 13 (1.9)).

1.22 EXAMINE UNDERSIDE OF DECK

- .1 Inspect underside of deck to ensure fasteners will not damage interior electrical and mechanical services.
- .2 Notify Consultant of any adverse conditions to Section (07 50 13 (1.9)).

1.23 SUBMITTALS

- .1 Submit to the Consultant a list of materials and, if applicable, substitute materials intended for use before they are ordered.
- .2 Submit Manufacturer's instructions for each product intended for use in the Work.
- .3 Submit documentation specified under Roofing Contractor's Quality Control, including:
 - .1 Roof Plan Drawings documenting the record of construction.
 - .2 Written records of construction.
 - .3 Bills of lading and labels from materials.
 - .4 "As-built" Drawings at the end of the project:
- .4 If applicable, submit Pull-Out Test results for fasteners before proceeding with the Work.
- .5 Submit Cut Test results for the finished roofing.
- .6 Submit Warranties on the pre-approved form.
- .7 Do not proceed with Work until relevant submissions are reviewed.
- .8 Allow 5 working days from the date of receipt for review of submittals.
- .9 Additional requirements may be specified in other Sections of the Specification.

1.24 SHOP DRAWINGS

- .1 Submit fully detailed dimensioned Shop Drawings wherever requested in the Specification before proceeding with Work.
- .2 Shop Drawings refer to Drawings, designs, schedules, brochures and illustrations.
- .3 The Roofing Contractor is responsible to cross reference Shop Drawings to all applicable portions of the Contract.
- .4 Shop Drawings shall show clearly the construction, size, layout, joints, seams, provision for expansion, stiffeners, cleat fasteners, anchorage, designation of materials, colour, finishes and all other relevant information.
- .5 Unless otherwise specified, submit Engineered Shop Drawings, including but not limited to the following Work:
 - .1 Insulation: Base Insulation and fastener layout;
 - .2 Insulation: Tapered Insulation (sumps) at roof drains as specified under Tapered Insulation & Crickets;
 - .3 Insulation: Tapered Insulation, crickets and fastener layout at roof perimeter as specified under Tapered Insulation & Crickets;
- .6 When specified in individual Sections of the Specification, Drawings are to be stamped by a qualified Engineer, licensed in the Province in which the Work is to be undertaken.
- .7 Until submissions are reviewed, Work involving relevant products may not proceed.
- .8 Shop Drawings submittal and re-submittal must be completely identified by the following:

- .1 Project Name.
- .2 Project Number.
- .3 Name and Address of Roofing Contractor.
- .4 Name and Address of Sub-Contractor, Supplier and/or Manufacturer.
- .5 Drawing Number, Date and Revision Dates.
- .6 Specification Section to which the Submittal applies.
- .9 Stamp and sign the Shop Drawings indicating that they have been checked and reviewed prior to submission.
- .10 Review of Shop Drawings is for the sole purpose of ascertaining compliance with general design concept, does not constitute approval, nor does it relieve the Roofing Contractor from complying with the Contract documents. The Roofing Contractor is responsible for the designs inherent in the Shop Drawings and the performance of completed Work including any oversights and errors that result. The review and any subsequent re-submittals will not be a cause for extension to the Contract completion date or schedule.
- .11 Submit Shop Drawings in triplicate.
- .12 New information cannot be added to Shop Drawings previously submitted. New information is to be submitted on new Shop Drawings.
- .13 Shop Drawings that do not comply with all requirements will be stamped “REVISE AND RESUBMIT”.
- .14 Shop Drawings deemed to comply with these requirements will be stamped “REVIEWED”.
- .15 Keep copies of “REVIEWED” Drawings on site for reference.
- .16 Allow 5 working days from the date of receipt for review of Shop Drawings.
- .17 Additional requirements may be specified in other Sections of the Specification.

1.25

PRODUCT DATA

- .1 Product data includes: Manufacturer’s catalogue sheets, brochures, literature, performance charts, reference standards, labels on products, and diagrams used to illustrate standard manufactured products.
- .2 Unless otherwise specified, submit to the Consultant the following items before they are ordered:
 - .1 A list of materials intended for use;
 - .2 Standard colour charts for painting rooftop equipment;
 - .3 Standard colour charts for eavestroughs, downspouts, water-conductors, metal flashings and prefinished metal siding; and;
 - .4 Manufacturer’s catalogues, brochures, literature, and performance charts detailing reference standards for alternative materials and products intended for use.
 - .5 Submit two (2) copies of product data to the Consultant upon request.

1.26

SAMPLES

- .1 When the submission of samples is requested in individual Sections, submit one (1) sample for review unless otherwise requested.
- .2 Unless otherwise specified, submit samples before proceeding with Work, including but not limited to the following:

- .3 Submit samples of alternative materials and products intended for use.
- .4 A sample is an example of material or equipment for quality, finish and workmanship.
- .5 Submit the full range of the sample including colour, pattern or texture.
- .6 Reviewed and accepted samples will become standards of quality of Work and material against which installed Work will be verified.
- .7 Allow 5 working days from the date of receipt for review of samples.
- .8 All colours to be approved by the Architect.

1.27

MOCK-UPS

- .1 When the requirements for a mock-up is requested in individual Sections or shown on the Drawings, erect mock-ups at locations acceptable to the Consultant for approval.
- .2 Construct built-in Mock-Up for review before proceeding with the Work, including but not limited to the following:
 - .1 Miscellaneous Fixtures: Installed roof drain;
 - .2 Miscellaneous Fixtures: Installed modified bitumen membrane sheet layout at drains;
 - .3 Miscellaneous Fixtures: Installed custom-fabricated scupper/overflow scupper; and,
 - .4 Miscellaneous Fixtures: Installed pre-manufactured through-wall overflow scupper.
- .3 Provide a 1200 mm (4'-0") mock-up for each item.
- .4 Reviewed and accepted mock-ups will become standards of quality of Work and material against which installed Work will be verified.
- .5 Failure to prepare a mock-up in a timely manner is insufficient reason for an extension of Contract time.
- .6 Verify all dimensions and conditions and provide alterations required to adapt Work to specific site conditions without additional cost.
- .7 Allow 24 hours for review of the mock-up.
- .8 All colours to be approved by the Architect.
- .9 The mock-up, if acceptable to the Consultant, may form part of the finished Work.
- .10 Additional requirements may be specified in other Sections of the Specification.

1.28

CONSULTANT FIELD OBSERVATIONS

- .1 Notify the Consultant and Material Manufacturer at least 48 hours before Work commences. Provide 24 hours notice of delays and restarts.
- .2 If the Roofing Contractor covers the Work before it has been inspected; the Roofing Contractor must uncover such Work.
- .3 If the initial inspection required establishing compliance with the Contract documents indicates non-compliance, additional re-inspection or testing must be performed.
- .4 The cost of re-inspection and testing performed by the Consultant will be borne by the Roofing Contractor and deducted from the price of the Contract.
- .5 Replace all poor quality Work or inferior products to meet specified requirements.

- .6 All Work under the Contract, including correction of deficiencies and submission of Warranties, must be completed within 10 working days of the date of the Semi-Final Inspection Report.
- .7 The Roofing Contractor must replace or correct Work not completed in accordance with the Contract. If in the opinion of the Consultant, it is not expedient to correct Work not done in accordance with the Contract, the Consultant may deduct from the Contract Price the difference in value between the Work as done and called for by the Contract. The difference will be returned to the School Board. The Consultant will determine the amount.

1.29

ROOFING CONTRACTOR'S QUALITY CONTROL

- .1 The Roofing Contractor shall appoint a worker for the purpose of quality control on the construction site (Quality Control Inspector) to ensure that the Work is installed in accordance with the Contract, Specification and Drawings.
- .2 In addition to procedures that may be specified elsewhere, on Drawings provided by the Consultant, the Roofing Contractor's Quality Control Inspector shall maintain a Roof Plan showing the following record of construction:
 - .1 The progress and limits of each day's work.
 - .2 Locations of water cut-offs.
 - .3 Locations and elevations of low points that will pond water.
 - .4 Areas and quantity where lightweight fill has been installed.
 - .5 Areas where additional waterproofing has been installed to build-up low points.
 - .6 Areas that have been double poured with asphalt and gravel (other than corners and adjacent to equipment).
- .3 In addition to procedures that may be specified elsewhere, the Roofing Contractor's Quality Control Inspector shall maintain written records of the following:
 - .1 A written record of the workers on site.
 - .2 A written record of changes that affect the Work (i.e. site instructions, change orders, addenda, etc.).
 - .3 A written record of materials shipped to and incorporated in the Work including dates, name of Manufacturer, type of material, lot and serial numbers and compliance standards as written on the labels.
 - .4 A written record of bitumen temperatures on forms provided by the Consultant at the Pre-Construction Meeting (i.e. Bitumen Temperature Log). Provide continuous supervision and monitor the temperatures of tankers and kettles to ensure that bitumen is not overheated. Check temperature of bitumen in the tanker, kettle, mop cart or felt layer at minimum 30-minute intervals with an accurate thermometer.
 - .5 A completed Hot Work and Open Flame Checklist, a copy of which shall be provided by the Consultant at the Pre-Construction Meeting.
- .4 In addition to procedures that may be specified elsewhere, the Contractor's Quality Control Inspector shall make available on a daily basis the following:
 - .1 A copy of bills of lading for each shipment of bulk asphalt delivered.
 - .2 Labels showing serial and lot numbers for each type and lot of materials.
 - .3 Samples required by the Specification.

- .5 The Contractor's Quality Control Inspector shall provide a copy of "as built" Drawings at the end of the project:
 - .1 On two sets of white prints provided by the Consultant, maintain Project Record Drawings that accurately record deviations from Contract documents, including field changes of dimensions, Details and changes made by Change Orders.
 - .2 Record changes on one set of prints in red. At completion of project and prior to final inspection, transfer changes to second set and submit both sets to the Consultant.

1.30

REMOVAL OF SAMPLES FOR TESTING

- .1 Provide samples of material to testing laboratory to allow verification of installed Work. The Roofing Contractor will cooperate with the Consultant and/or Test Laboratory as requested to facilitate inspection and testing and removal and delivery of samples.
- .2 Carry the cost for testing of roof samples in your Base Price unless otherwise shown paid from the Cash Allowance.
- .3 Remove one roof sample, 305 mm x 305 mm (12" x 12") randomly located by the Consultant, for each day's work (minimum 1 per roof section), as follows:
 - .1 Typically remove samples of membrane before installation of cap sheet, unless otherwise directed.
 - .2 When retaining samples cut only through 2-ply of base sheet, unless otherwise directed.
- .4 In addition, samples of unused ply felt or modified bitumen base and cap sheets, each 3000 mm (10'-0") long by sheet width, shall accompany each roof sample. Larger samples may be requested at no additional cost.
- .5 Provide a 500 mil sample of residue asphalt left in kettles and/or tankers from previous projects prior to its use on this project.
- .6 Provide a 500 mil sample of each type of bitumen before heating.
- .7 Provide daily a 500 mil sample of each type of bitumen after heating.
- .8 Containers for asphalt samples will be provided to the Contractor by the testing agency.
- .9 Locate cut tests away from drains, projections, curbs, etc.
- .10 Cut around template supplied by the testing agency. The testing agency will provide plastic bags and labels to retain sample. Locate cut area on Roof Plan. The testing agency protects samples from damage during removal, storage or delivery.
- .11 Repair the area as follows:
 - .1 Fill void left by the sample removal with membrane installed with bitumen to match the finished height of membrane.
 - .2 Restore the membrane to match existing materials and finish by repairing the cut test with 1-ply base sheet and 3-ply felt to match the materials employed in the construction of the roof. Base sheet to lap onto the roof 150 mm (6") each side of cut test, then each additional ply to lap minimum 75 mm (3") beyond preceding ply.
 - .3 Install cap sheet membrane over the repair area when samples are removed from the finished roof.

- .13 Retain and pay for the services of Global Laboratory and Research Corporation as the testing laboratory at Tel.: (905) 878-8993, Fax: (905) 878-5166 for the testing of all felt, asphalt and membrane samples.
- .14 Comply with testing laboratory's recommendations as it relates to removing, wrapping, labeling, handling and recording of samples.
- .15 Arrange to deliver the samples to the testing agency within 24 hours of removal. Testing agency to protect samples from damage and maintain custody of samples until end of project.
- .16 Fax a copy of all reports and records to the Consultant daily. Fax to the Consultant the results of analyzed samples no later than two days following the delivery of the sample.
- .17 In the event that test results are unsatisfactory, additional cuts and the Consultant may request lab testing, the cost of which will be borne by the Roofing Contractor.
- .18 If a test shows that the Contract requirements have not been met, the Contractor before proceeding with additional Work must provide to the School Board and Consultant a written proposal as to how the Contractor intends to bring the Work into compliance with the Contract.

1.31

FLOOD AND WATER TEST

- .1 If specified at locations agreed to by Consultant, complete flood and water testing of all flashings, projections, and equipment and roofing system.
- .2 Water test all flashings and seals for water tightness with a hose. Temporarily plug drains during testing and raise water levels on the roof to 25 mm (1") and maintain water depth for 24 hours. Monitor site conditions and remove test plugs in the event of inclement weather.
- .3 At end of test period, remove drain plugs and check levels for ponding water to verify that specified requirements have been achieved.
- .4 Repair all areas that resulted in leaks and re-test as required.
- .5 **Make good** damage caused by water test to match existing material and finish.

1.32

FINAL CLEANING

- .1 Clean the roof and drainage system free of debris at project completion.
- .2 Clean interior and exterior surfaces including glass and all polished surfaces of all contaminants including bitumen, grease, dust, dirt, stains, labels, fingerprints and other foreign materials.
- .3 Clean exposed surfaces such as walls, rooftop equipment, gas lines and flashings free of dirt, bitumen, adhesive or caulk before leaving the site. **Make good** finishes to the satisfaction of the Consultant and School Board.
- .4 Use cleaning materials and methods that do not damage surfaces, and/or are recommended by the Manufacturer.
- .5 Schedule cleaning operations so that resulting dust, debris and other contaminants do not fall on or damage completed Work.
- .6 Leave roof, building and landscape free of debris, spills and bitumen spread by pedestrian or construction traffic.
- .7 Rake out excessive piles of surface aggregate to a neat and even surface.

- .8 Broom clean and water wash paved, concrete or paving stone surfaces. Rake grounds around building free of all debris.
- .9 Remove debris and surplus materials from crawl areas and accessible concealed spaces.
- .10 Clean all drain screens free of bitumen and contaminants.
- .11 Removal all surplus materials and equipment from the site.
- .12 **Make good** and pay all costs and fees required to rectify damage caused by the Work.

1.33 PAINTING

- .1 Touch-up and **make good** all painted surfaces damaged by Work of this Contract with material and colour to match the existing.
- .2 Comply with the Manufacturers' instructions for cleaning, and for mixing and painting.

1.34 DISPOSAL

- .1 Remove from site all surplus or waste material in compliance with all relevant Municipal, Provincial and Federal regulations.

1.35 WARRANTIES

- .1 The Roofing Contractor must submit Warranties before final payment.
- .2 The Roofing Contractor must submit a Warranty on the pre-approved form. A copy of the form is enclosed and forms part of the Specification. The Warranty period is two (2) years.
- .3 The Warranty period commences on the date of substantial completion of the Work.
- .4 The Warranty includes the prompt remedy of defects stipulated on the Certificate of Roofing Warranty, including all materials, labour, equipment and services required to **make good**. In the case of factory-fabricated components, the Roofing Contractor is to supply and install new components. The Warranty also includes **making good** other Work, components, finishes and other property damage that has resulted in the course of remedying defects.
- .5 In the case of Work performed by Sub-Contractors and/or Suppliers, where additional Warranties are specified, the Contractor must secure such additional written Warranties and submit same to School Board.
- .6 The Warranty is not intended to restrict the liability of the Roofing Contractor arising out of any applicable law.
- .7 In addition, as dictated by the roof design, dislodged surfacing and degradation of colour that detracts from the performance or visual appearance of the roof will also be judged as defective Work and will require correction under the Contract.
- .8 All defective Work and/or material evident during the period of the 2-year Warranty must be repaired and to be "**made good**" to the original intent of the Drawings and Specification.
- .9 In addition, within the 2-year Warranty period, the Roofing Contractor must remedy any defects that appear and pay for any damage to other Work that has resulted from the Work under this Contract.
- .10 The School Board reserves the right to either reject or accept any Warranty having qualification other than that stated herein.
- .11 In compliance with the Certificate of Roofing Warranty, the Roofing Contractor shall, thirty (30) days prior to the expiration of the Warranty, notify the School Board in writing

of the lapsing of the Warranty. The Roofing Contractor shall arrange to accompany the School Board or his representative on an inspection of the Work to ascertain the condition of the roof and correct all deficiencies, without additional cost, as specified in the Certificate.

- .12 If the site conditions at the time of the scheduled inspection do not allow for a proper evaluation of the roof's condition, then the inspection may be postponed until such conditions occur. If the inspection is postponed, the Roofing Contractor agrees to extend the warranty until the inspection is complete. All deficiencies discovered during the inspection shall be reported to the Consultant and School Board. All deficiencies shall be repaired in the manner previously indicated within 15 days of such inspection or as soon as weather permits in the event of inclement weather.
- .13 In addition to the Roofing Contractors two (2) year warranty, the Roofing Contractor must provide an extended 15-year Manufacturer's Materials Warranty for labour, materials and workmanship with a No Dollar Limit from date of Substantial Performance. The Roofing Contractor must be an approved application/installer of the specified membrane Manufacturer prior to tender closing. Submit a current proof of approval with tender.
- .14 The Extended Manufacturer's Warranty shall run concurrently with the Contractor's two (2) year Warranty.

1.36

DAILY OPERATIONS

- .1 Complete entire roofing operation up to line of termination of each day's work as required by design intent in order to safeguard and protect the Work and building from damage and weather. The cap sheet must be installed if the onset of unfavorable weather does not allow for a complete assembly.

1.37

ASPHALT

- .1 Membranes:
 - .1 Roofs with slopes up to 127 mm/m (1.5"/ft.) (1:8): Use Type II asphalt.
 - .2 Roofs with slopes greater than 127 mm/m (1.5"/ft.) (1:8): Use Type III asphalt.
- .2 Felt and Bitumen Vapour Barriers: Use Type III asphalt.
- .3 Coverboard: Use Type III asphalt.
- .4 Insulation installed with bitumen: Use Type III asphalt.
- .5 Mineral Fibre Cant Strips installed with bitumen: Use Type III asphalt.
- .6 Bitumen for Aggregate Surfacing: Use asphalt type as specified for the roof membrane.
- .7 Heat asphalt to obtain EVT temperature at point of contact as recommended by the asphalt Manufacturer.
- .8 If heating temperatures are not shown on the containers or bills of lading for the asphalt on site, heat to no more than 246°C (475°F) for Types II and III.
- .9 Maintain constant supervision of tankers and kettles to ensure that bitumen is not overheated. Check temperature of bitumen at a minimum of 30-minute intervals with an accurate thermometer. Maintain a record of bitumen temperatures.
- .10 In cold weather, insulate pump pipes. Transport bitumen on the roof in insulated carriers.
- .11 Unless otherwise specified by the Manufacturer's literature, use the following EVT temperatures for felt application:

Asphalt	Mechanical Application	Mop Application
Type II	228°C (±13°C) 442°F (±25°F)	212°C (±13°C) 414°F (±25°F)
Type III	246°C (±13°C) 475°F (±25°F)	229°C (±13°C) 444°F (±25°F)

- .12 Reduce EVT temperature of asphalt to that recommended by membrane Manufacturer when installing modified membranes.
- .13 Reduce EVT temperature of asphalt when installing insulation with bitumen, as recommended by the Manufacturer. If information is not available, reduce temperature by 13°C (25°F).
- .14 Reduce EVT temperature of asphalt when installing bitumen and aggregate surfacing, as recommended by the Manufacturer. If information is not available, reduce temperature by 22°C to 33°C (40°F to 60°F).
- .15 Bitumen shall only be heated up to 13°C (25°F) of the flash point, and shall not be held at final blowing temperature for more than 4 hours. Do not use asphalt that is outside bitumen heating range. Remove overheated bitumen from the job site.
- .16 Install bitumen in a uniform, continuous application insuring good adhesion is achieved. Ensure that bitumen bleeds out from both sides of the roll not less than 13 mm (0.5”).
- .17 For No. 15 felts, apply asphalt at the rate of not less than 1 kg/m² (20 lbs/100 ft²) per coat.
- .18 For glass felts, apply asphalt at the rate of not less than 1.2 kg/m² (25 lbs/100 ft²) per coat.
- .19 For modified bitumen membranes installed with bitumen, apply asphalt at the rate of not less than 1.2 kg/m² (25 lbs/100 ft²) per coat.
- .20 For coverboard, apply asphalt at the rate of not less than 1.45 kg/m² (30 lbs per 100ft²).
- .21 For insulation installed with bitumen, apply asphalt at the rate of not less than 1.2 kg/m² (25 lbs./100 ft²), unless otherwise specified.
- .22 For mineral fibre cant strips installed with bitumen, apply asphalt at the rate of not less than 1.45 kg/m² (30 lbs per 100ft²).

1.38 DRAINS AND DRAINAGE PLANE

- .1 Inspect surfaces and ensure that:
 - .1 Roof deck is level or sloped to drains in conforming to design intent.
 - .2 Roof drains are set at a level to drain and are connected or capped.
 - .3 Inspect roof drains to ensure they are open and working properly.

1.39 HIDDEN SERVICES

- .1 Investigate the location of all known hidden services by reviewing interior conditions, plans, Specification and Drawings for the building, any subsequent alterations, completion of cut tests and interviewing those involved in the construction and maintenance of building services. These services include but are not limited to mechanical, electrical, cable, communication, computer, security or roof assembly. Ensure all services are located and will be protected from damage under the Contract.

1.40 EQUIPMENT

- .1 Inspect equipment affected by the Work, including but not limited to rooftop equipment, curbs, drains and plumbing, mechanical, electrical and services, to ensure they are in good repair. Record any damage and advise the Consultant.
- .2 During roofing, ensure that all mechanical equipment is properly supported.
- .3 Notify School Board and/or Consultant of any equipment which is damaged prior to the commencement of Work.

1.41 ADVISE CONSULTANT

- .1 Advise the Consultant of any unusual circumstances affecting the Work. Notify the Consultant of any defective or malfunctioning equipment or drains found plugged, damaged or leaking. Do not commence Work until defects and incorrect levels have been verified and rectified.

1.42 PROCEEDING WITH WORK

- .1 The commencement of Work is proof that the Contractor has accepted surfaces as satisfactory and accepts responsibility for appearance and performance of completed Work.
- .2 Be responsible and repair and pay all cost and fees required to rectify damage caused by Work of this Contract with materials and finish to match the original.

1.43 SERVICES

- .1 Contractor to verify location of services prior to commencement of Work. Notify School Board/Consultant of any unusual conditions.
- .2 The Contractor and their employees must hold valid certificates for the Work undertaken.

1.44 NEW ROOF SYSTEMS

1. New Roof Systems at Place of The Work are as follows and include all miscellaneous items;

1. Roof Areas 'R1' (Gym) – Acoustic Metal Deck

- Sheet Metal Flashing, Trim, & Sealants
- 2-Ply Modified Bituminous Membrane Flashings
- 1-Ply Modified Bituminous Membrane Cap Sheet
- Overlay Board with Integral Membrane Base Sheet – In Asphalt
- Tapered Insulation – In Asphalt
- 1-Layer 75 mm (3 in.) Polyisocyanurate Insulation on
- 1-Layer 89 mm (3.5 in.) Polyisocyanurate Insulation– In Asphalt
- Thermal Barrier / Vapour Retarder – In Adhesive
- Acoustic Mineral Insulation
- Acoustic Metal Deck

2. Roof Areas 'R2' 301

- Sheet Metal Flashing, Trim, & Sealants
- 2-Ply Modified Bituminous Membrane Flashings

- 1-Ply Modified Bituminous Membrane Cap Sheet
- Overlay Board with Integral Membrane Base Sheet – In Asphalt
- Tapered Insulation– In Asphalt
- 1-Layer 75 mm (3 in.) Polyisocyanurate Insulation on
- 1-Layer 89 mm (3.5 in.) Polyisocyanurate Insulation– In Asphalt,
First Layer - Mechanically Fastened, Second Layer – In Asphalt
- Self-Adhesive Vapour Retarder
- Metal Deck

3. Roof Areas ‘R3’ 101 Front Entrance Canopy

- Sheet Metal Flashing, Trim, & Sealants
- 2-Ply Modified Bituminous Membrane Flashings
- 1-Ply Modified Bituminous Membrane Cap Sheet
- Overlay Board with Integral Membrane Base Sheet – In Asphalt
- Tapered Insulation– In Asphalt
- Self-Adhesive Vapour Retarder
- Metal Deck

4. Roof Area ‘R4’ 201 Child Care Roof

- Sheet Metal Flashing, Trim, & Sealants
- 2-Ply Modified Bituminous Membrane Flashings
- 1-Ply Modified Bituminous Membrane Cap Sheet
- Overlay Board with Integral Membrane Base Sheet - In Adhesive
- Tapered Insulation – In Adhesive
- 1-Layer 75 mm (3 in.) Polyisocyanurate Insulation on
- 1-Layer 89 mm (3.5 in.) Polyisocyanurate Insulation– In Adhesive
- ***Provide additional Polyisocyanurate insulation as required to bridge camber of coreslab***
- Torch Grade Vapour Retarder
- Concrete/Core Slab Deck

Part 2

Products

2.1

GENERAL

- .1 All standards, regulations and specifications listed herein are considered to be the latest available edition.
- .2 Compatibility between materials is essential. Use only materials that are known to be compatible when incorporated in the roof assembly.

2.2

PRIMERS

- .1 Asphalt Primer: Conforming to CGSB 37-GP-9Ma-83.
- .2 Modified Bitumen Primer: For modified roofing, as recommended by the membrane Manufacturer. To CGSB 37-GP-9Ma-83.

2.3 MEMBRANES

- .1 Modified Bitumen Base Sheet – Mop Grade: Minimum 95 gm/m² glass reinforced, SBS polymer modified, Sand/Sand base sheet to CGSB 37-GP-56M-85, Type II, Class P, Grade 2, as supplied by Bakor, IKO, Johns Mansville, Siplast or Soprema.
- .2 Modified Bitumen Base Sheet for Membrane Flashings - Torch Grade: 180 gm/m² non-woven polyester reinforced, SBS polymer modified base sheet to CGSB 37-GP-56M-85, Type II, Class P, Grade 2, as supplied by Bakor, IKO, Johns Mansville, Siplast or Soprema.
- .3 Modified Bitumen Cap Sheet for Membrane Flashings - Torch Grade: 250 gm/m² reinforced, SBS polymer modified cap sheet, to CGSB 37-GP-56M-85, Type II, Class G, Grade 2, as supplied by Bakor, IKO, Johns Mansville, Siplast or Soprema. Colour to be light grey.
- .4 Self-Adhering Base Sheet: Minimum 160 gm/m² non-woven polyester reinforced, SBS polymer modified base sheet to CGSB 37-GP-56M-85. Sopralene Flamstick by Soprema or “NP 180 Tack Sheet” by Bakor Inc., ArmourBond 180 by IKO Industries Ltd., or approved equal. Primer as recommended by the Manufacturer of the membrane (membrane underlay).
- .5 Firestop Tape: Self-adhering glass-reinforced modified bitumen membrane, minimum thickness 1.5 mm x 150 mm (0.06” x 6”) wide. Soprema Sopraguard self-adhering membrane, Modified Roof Tapes by IKO Industries Ltd., or approved equal.

2.4 INSULATION

- .1 Polyisocyanurate: Rigid foam board, minimum compressive strength 138 kPa (20 psi), Type III, Class 2, manufactured with HC blowing agent, meeting requirements of CAN/ULC S126 and CAN/ULC-S704-03 and S770-03 for LTTR values. Approved and listed for Factory Mutual 1 - 75 wind classification and Factory Mutual 4470 requirements for Class 1 fire. Maximum board size 1200 mm x 1200 mm (4’ x 4’).
- .2 Fibreboard: Minimum 2% asphalt impregnated, minimum 310 kPa (45 psi) compressive strength, to CAN/ULC S706-02, thickness as shown on Drawings and Summary of Work, maximum board size 600 mm x 1200 mm (2’ x 4’).
- .3 Perlite: High density to ASTM C728-03. Thickness as specified in the Summary of Work and/or shown on the Drawings. Maximum board size 1200 mm x 1200 mm (4’ x 4’). Fesco board high density by Johns Mannville.
- .4 Tapered Drain Sumps: Polyisocyanurate tapered minimum 2% from a maximum thickness matching the base insulation to the drain. Type and size as specified and/or shown on the Drawings.
- .5 Tapered Insulation and Crickets: Polyisocyanurate or plain fibreboard as shown above. Type, size and thickness as shown on the Drawings.

2.5 MISCELLANEOUS ROOFING SEALANTS AND ADHESIVES

- .1 One Component Rubberized Mastic: Polybitume by Henry, Sopramastic 200 by Soprema, MBR flashing cement by Johns Mannville, IKO Aquabarrier Mastic by IKO Industries Ltd., or approved equal to CAN/CGSB 37.5M.
- .2 Two Component Modified Sealant: Cold Gold flashing cement by IKO Industries or approved equal.

- .3 Box Filler: One part pourable sealer by Chemlink Inc. and M1 Structural Sealant Primer and MS Detail by IKO Industries Ltd.”.

2.6

MISCELLANEOUS FIXTURES

- .1 Galvanized Metal Sleeve Inserts: 26 gauge galvanized steel, straight body, 150 mm (6”) high. Sized slightly larger than pipe or conduit as specified and/or shown on Drawings.
- .2 Sanitary Vent Stack Flashings: Size as specified and/or shown on the Drawings, by Altra Metal Specialties Inc. or approved equal: Aluminum, tapered body w/ tapered rubber gasket collar, 350 mm (14”) G-AVTB-R14 (supply by Sections 22 00 00 and 23 00 00);
- .3 Vandal Resistant Vent Cap: Stainless steel vandal resistant vent cap G-VRC by Altra Metal Specialties or approved equal (supply by Sections 22 00 00 and 23 00 00).
- .4 Metal Sleeves: Size as specified and/or shown on the Drawings, by Altra Metal Specialties Inc. or approved equal 300 mm (12”) G-ATS-12 (supply by Sections 22 00 00 and 23 00 00):
Aluminum, tapered body, 350 mm (14”) G-ATS-14.
Pipe Rain Collar: Clamp-on type rain collar: Aluminum G-ASRC, by Altra Metal Specialties Inc. or approved equal or as otherwise shown on the Drawings (supply by Sections 22 00 00 and 23 00 00).
- .5 Gravel Stops: To Section 07 62 13.
- .6 Roof Drains: Copper drain with clamping ring and cast aluminum strainer, by Altra Metal Industries Inc. Model G-CBD-CR-X-SS. Size as specified by Mechanical Engineer with control flow devices where shown (supply by Sections 22 00 00 and 23 00 00).
- .7 Scuppers and Through-Wall Overflow Scuppers (Custom-Fabricated): To Section 07630 (supply by Sections 22 00 00 and 23 00 00).
- .8 Scuppers and Through-Wall Overflow Scuppers (Custom-Fabricated): To Section 07630.

2.7

FASTENERS

- .1 Obtain Consultant and School Board’s approval when using hammer drills since drilling hours may be restricted.
- .2 All fasteners for steel, wood, concrete and specialty decks must meet Factory Mutual approvals.
- .3 Use galvanized, copper, aluminum or stainless nails or screws as most compatible with materials being employed. Screws shall be minimum 38 mm (1.5”) #10 cadmium plated hex head with neoprene and steel washers by Atlas Bolt or approved equal. Rawl lead shields as required for anchoring. Use fasteners as most generally suitable to Consultant’s approval. Nails and caps to be hot dipped galvanized or mechanically galvanized to CSA G164-M. Supply by Lexcor (1-800-268-2889) or AMA Roof Supplies (1-877-594-6071) or approved equal.
- .4 General Fasteners: No. 10 ardox nails of length to penetrate bases minimum 13 mm (0.5”). Horizontal Membrane Fasteners: Use 50 mm (2”) ardox nails with minimum 25 mm (1”) solid caps for securing membrane to insulation stops. Nails and caps to be hot dipped galvanized or mechanically galvanized to CSA G164-M. Supply by Lexcor (1-800-268-2889) or AMA Roof Supplies (1-877-594-6071) or approved equal.
- .5 All nails to meet CSA B111-1974 (R2003).
- .6 All tapping and driving screws to meet ASTM B18.6.4 – 1999.

- .7 All wood screws to meet ASTM B18.6.1 – 1981.
- .8 All galvanizing to meet ASTM A153/A153M-05 and CAN/CSA-G164-M92.
- .9 Pressure Treated Wood: When pressure treated wood is specified, use minimum No. 304 stainless steel fasteners.
- .10 All fasteners for decks must meet Factory Mutual approvals.
- .11 All fasteners, size and spacing to meet the most stringent requirements of this Section, the Drawings, the Ontario Building Code or Factory Mutual requirements.
- .12 Steel Deck Insulation Fasteners: Factory Mutual approved, corrosion resistant, anti-back out screws: Dekfast No. 12 Phillips Head Fastener with 2.875" Recessed Galvalume Steel Hex Insulation Plate or Dekfast 75 mm (3") Round Plastic Lock Plate, by SFS intec, or approved equal. Fasteners spaced to achieve minimum pull-out to meet Factory Mutual 1 - 75 wind uplift approval. Of sufficient length to penetrate the top flute of the deck 19 mm (0.75").
- .13 Horizontal Membrane Fasteners: For securing membrane to insulation stops, same as 1.4 above.
- .14 Vertical Flashing Fasteners: For Wood: No. 10 hot dip galvanized spiral nails. For Metal: Powers No. 12 "Deck Screws" with "Perma-Seal" coating. For Concrete, Brick or Masonry: Perma-Grip (Tru-Fast) "Tap-Grip" concrete screw with "Tru-Kote" coating, Powers "Tapper" concrete screw with "Perma-Seal" coating, Powers "Roofing Spike" with "Perma-Seal" coating, or Powers "Zamac Nailin". All fasteners to be 50 mm (2") length with 25 mm (1") hot dipped galvanized solid caps.
- .15 Metal to Wood: Where exposed fasteners are specified or shown, use No. 10 cadmium plated, pre-finished hex head screws with neoprene and steel washers by Atlas Bolt or approved equal, of sufficient length to penetrate the base minimum 32 mm (1.25"). Minimum length 38 mm (1.5"). Colour of screw head to match colour of flashing. Provide touch-up paint as required to coat all exposed surfaces of screws damaged during the driving process. Alternatively, use screws with colour match nylon caps where shown or approved by the Consultant.
- .16 Pull-Out Tests: The type of fastener may be subject to results of pull-out tests. When security of fasteners appears to be in doubt, in consultation with the Consultant and fastener supplier, provide pull-out tests at a minimum of five locations for each type of material and fastener being employed. Minimum pull-out resistance of each fastener shall be 45 kg. (100 lb.). Submit results to Consultant and act on Manufacturer's written recommendations on the type, length and spacing of fasteners to hold the item being secured permanently in place, and to prevent warping, deflection or displacement of materials against all wind and weather conditions. Submit summary of findings to the Consultant for review before proceeding.

Part 3

Execution

3.1

GENERAL

- 1. Execute Work in accordance with the Specification, Drawings and Details.
- 1. Anchor roofing to requirements of Insurance Underwriter and authorities having jurisdiction.
- 2. Do not install any roofing when temperatures, including wind chill, is below -26°C (-15°F).

3. Lay out Work to avoid working over newly installed felts. If any foreign material is inadvertently incorporated into the membrane, remove the material immediately and repair to restore membrane to its original integrity. Repair with 4-ply felt or 2-ply modified bitumen base and cap sheet to match the original membrane type. All repair felts or sheets shall lap over the repair area and each previous ply 150 mm (6") in each direction. Broom all repair areas into place to ensure positive contact.
4. Maintain equipment in good working order to ensure control of roofing operations and protection of Work. Types of roofing equipment and laying techniques to be employed are to meet the approval of the Consultant.
5. When using SEBS modified asphalt, use an indirect, oil filled, jacketed kettle with circulating pump.
6. Before bitumen has set, avoid foot traffic or prolonged point loading on membrane that will result in displacement of bitumen between plies of felt or membrane.
7. Do not penetrate roof deck with any fastening devices that would do damage or impair the function of the roof assembly.

3.2 DAILY OPERATIONS

1. Unless otherwise specified, complete entire roofing operation up to the line of termination of each day's work to meet the design intent in order to safeguard and protect the Work and building from damage and weather.
2. Do not leave roofing felts exposed dry overnight; coat the surface of the last ply of felt with Type II asphalt immediately following installation of the felt.
3. Install base and cap sheet membrane and flashing the same work period.

3.3 PRIMER

1. Prime masonry and concrete surfaces which will be in direct contact with asphalt at the rate of 0.15L/m² (0.33 gal/100ft²) to CGSB 37-GP-15M-84. Ensure that surfaces are tack-free before proceeding.
2. Limit quantity of primer at deck openings and points of termination to prevent bleed through to the building interior.
3. Broom primer into surface.
4. Re-prime all surfaces not covered the same work period that become contaminated with dust or become marred due to their exposure to roof traffic or weather.

3.4 AIR SEALS

1. Unless otherwise specified in Section 07 50 16, provide air seals at the roof perimeter and roof openings as shown on the Drawings.

3.5 BASE INSULATION

- .1 Install base insulation over vapour barrier to design intent and thickness as specified and/or shown on the Drawings.
- .2 On Steel and Acoustic Decks: Mechanically secure insulation to deck with fasteners and plates unless otherwise specified and/or shown on the Drawings. Submit Engineered Shop Drawings showing board and fastener layout. Install additional fasteners at all insulation "T" joints. Install insulation by applying a sprinkle mopping of Type III asphalt over vapour barrier at a rate of 0.6 to 0.75 kg/m² (12 to 15 lbs/100ft²) to temporarily hold

insulation in place. Adjust the length of the fasteners to accommodate variations in deck Factory Mutual 1 - 75 wind uplift rating to Paragraph 3.5 – Thermal Barrier Mechanical Fastening on Wood, Steel and Acoustic Decks unless otherwise specified. Complete random Pull-Out Tests to determine average Pull-Out Resistance. Adjust fastener density as per Factory Mutual Bulletin 1-29 if required.

- .3 Reduce EVT temperature of asphalt when installing insulation with bitumen, as recommended by the Manufacturer. If not available, reduce temperature by 13°C (25°F).
- .4 At termination points envelope insulation per item 3.12.5 above.
- .5 Stagger all end joints of insulation a minimum 300 mm (12”).
- .6 Stagger both end and side joints between insulation layers.
- .7 Butt sheets of insulation with moderate contact. Do not force insulation into place. Cut neatly at projections and points of termination. Replace all broken, damaged or misfit boards as Work progresses.
- .8 Where necessary, back-cut insulation to allow it to conform and stay bonded to irregular surfaces without bridging.
- .9 Following placement, walk boards into place to ensure positive bonding is achieved. Shim all insulation at areas of deck depression or deflections with mineral wool insulation cut to suit so as to maintain the level of finished surface.
- .10 At areas where ponding water will form on the finished surface, provide minimum 900 mm (3'-0”) wide drainage channels by cutting base insulation sloped from low point to drain. Check elevation with level and straight edge. Ensure positive slope to drain is achieved.

3.6

TAPERED INSULATION AND CRICKETS

- .1 Install tapered insulation as specified and/or as shown on the Drawings. Tapered insulation may be the first layer of insulation or may be installed over the base insulation.
- .2 When tapered insulation is installed directly on the deck, install to the requirements under Base Insulation. Conform to Factory Mutual requirements for spacing and number of fasteners required to provide Factory Mutual 1 - 75 wind uplift rating, unless otherwise specified. Submit Engineered Shop Drawings from the Manufacturer showing layout of the insulation boards and the spacing and number of fasteners for the field, perimeter and corners of the roof for review prior to manufacture.
- .3 When tapered insulation and or crickets are installed over the base insulation, install in a continuous layer of Type III asphalt. Offset the end joints between the first layer of insulation and the tapered insulation a minimum of 300 mm (12”). Where installed as the base layer, insulate per item 3.13 above.
- .4 Unless otherwise specified and/or shown on the Drawings at all drain locations, provide tapered polyisocyanurate insulation to form a sump all around the drain to promote positive drainage. Insulation to be tapered as per the tapered insulation plan. Make allowance for the thickness of the drain flange and clamp to ensure water flow will not be impeded. Adjust drain sumps and locations to suite site conditions.
- .5 A fibreboard or mineral fibre cant shall be provided and shaved as required, applied in full mopping of asphalt to provide smooth transition at abutting roof areas.

3.7

CAP INSULATION

- .1 Cover the base and tapered insulation with cap insulation installed in a continuous layer of Type III asphalt at a rate of not less than 1.45 kg/m² (30 lb/100ft²).

- .2 Install as specified for Base Insulation.
- .3 Offset joints of board with joints of insulation boards by a minimum 300 mm (12").
- .4 Offset end joints between rows of board by a minimum 300 mm (12").

3.8

MODIFIED BITUMINOUS MEMBRANE – GENERAL APPLICATION

- .1 Prior to commencing Work, arrange a site meeting with the Manufacturer and Consultant and provide a mock-up sample of finished Work for review in accordance with Section 07 52 00.
- .2 Inspect and seal all substrates to eliminate fire hazard. Use Firestop Tape and underlay membrane as required or recommended by Manufacturer.
- .3 Mechanical spreaders are not permitted to install modified membranes.
- .4 Use only bitumen, sealants, adhesive or mastics as specified by membrane Manufacturer. Provide written approval from Manufacturer when proposing any alternatives or substitutions.
- .5 Lay out all sheets as to allow them to relax a minimum of 30-minutes. When temperatures are below 4.4°C keep and lay out rolls in heated storage. Install rolls before temperature fallback of the sheet occurs.
- .6 Roof membrane to be installed in one sheet if possible.
- .7 Prior to installation, unroll the cap sheet and check for granular embedment width and alignment.
- .8 Layout membrane to ensure side lap of cap sheet does not occur within 150 mm (6") of roof drain.
- .9 Lay all membrane starting at low point to ensure that seams do not face water flow. Roll all membrane into place, true to line, free of buckles, air pockets, fishmouths and tears. Terminate base sheet and cap sheet membrane at base of cant strip. Base sheet flashings to be installed during the same work period as base sheet membrane.
- .10 On roofs with slope greater than 125 mm/m (1.5"/ft) (12.5%) or as otherwise specified and/or shown on the Drawings, install felts with the slope. Back nail first ply of felt to intermediate wood nailers using nails with 25 mm (1") caps at 300 mm (12") o.c. Install fasteners through the full 4-ply of felts at nailers located at the top of slope.
- .11 Overlap all end laps minimum 150 mm (6") and side laps 75 mm (3").
- .12 Offset all side laps between plies by 33%.
- .13 Offset all end laps between plies minimum 1200 mm (4").
- .14 At valley locations, run membrane continuously with the slope of the main roof. Lay out all sheets to ensure minimum side laps are maintained through valley area and short section of roof beyond. At these locations the side laps for the main roof will increase. Install membrane to Details and Consultant's direction onsite.
- .15 At end laps and other locations of cap sheet as required, use a hot air welder and trowel, embed granules to ensure proper bonding of overlapping sheets is achieved.
- .16 Ensure that a watertight seal is achieved at all overlaps and points of termination.
- .17 Carry base sheet flashing over face of building as shown on the Drawings.
- .18 Carry membrane up all vertical surfaces to point shown. Cut off corners at 45° at end laps to be covered by the next roll prior to installation of following sheet.

- .19 Seal the top of flashing membrane with liquid membrane to obliterate top edge flashing and fasteners.
- .20 Secure base and cap sheet to wood insulation stops immediately upon application with 38 mm (1.5") nails with 25 mm (1") caps at 225 mm (9") o.c. Verify procedure with Consultant on site. Seal fasteners through membrane immediately with modified sealant.
- .21 Do not walk on membrane during applications and until sufficient cooling has taken place as to allow for traffic without doing damage or marking surface.

3.9 MEMBRANE APPLICATION

- .1 In accordance with Specification, Drawings and Details, install new membrane and flashings system as specified.
- .2 Install all membrane in strict accordance with Manufacturer's latest printed instructions and application methods.

3.10 MOP/TORCH SYSTEM

Base Sheet Membrane

- .1 Unless otherwise specified or shown on the Drawings, install 2-ply base sheet membrane running with the roof slope, starting at the low point. Layout roll in place to verify alignment and proper overlap and re-roll prior to mopping. Allow 33% offset between base plies and cap sheet. Where 2-ply system is specified and shown install first ply in Type III asphalt and torch apply second ply. Offset joints between plies by 50%.
- .2 Install first ply of base sheet membrane into full mopping of specified asphalt at rate not less than 1.22 kg/m² (25 lbs/100ft²) in continuous application keeping no further than 2m (6'-0") ahead of the roll. Torch apply second sheet of base sheet membrane. Terminate both plies at base of cant strip or at vertical substrate.
- .3 Use broom or squeegee during membrane application to ensure complete bitumen embedment – free of wrinkles, air pockets or voids.
- .4 **Withhold bitumen 50 mm (2") short of all overlaps. Seal side and end laps with a torch or hot air welder.**
- .5 Ensure that a watertight seal of all membrane joints and points of termination is achieved.
- .6 Base sheet to terminate at base of cant strip or vertical substrate.

Base Sheet Flashings

- .1 Base sheet flashing to be installed during same period or base sheet membrane.
- .2 All flashings to be cut across the roll in 1 metre (3'-3") sections. Cut off corners at end laps to be covered by next flashing piece.
- .3 Provide chalk lines and install all membrane true to line. Install gusset reinforcement pieces at all corner locations.
- .4 Commence flashings from the drain or low points and overlap all side laps minimum 75 mm (3"). Base sheet flashings to extend 100 mm (4") onto roof surface and terminate as shown in Drawings.
- .5 Over flammable substrates install 1-ply self-adhering modified bitumen cap sheet flashing prior to torching base sheet flashing.

- .6 Install base sheet flashings in full mopping of TYPE III asphalt. Mop bitumen up parapet or eave as applicable, into strip of sealant. Apply enough bitumen to install one flashing piece at a time.
- .7 Place sheet into hot asphalt and press into place to ensure uniform adhesion and 13 mm (0.5") bitumen flow each side of the roll. Apply flashings free of air pockets, voids, wrinkles or fishmouths.
- .8 Extend base sheet flashing onto base sheet membrane minimum 150 mm (6").

Cap Sheet Membrane

- .1 Install specified cap sheet membrane running with the roof slope, starting at the low point and extending to the base of the cant strip or vertical substrate. Layout roll in place to verify alignment and proper overlap and re-roll prior to mopping. Offset cap sheet side laps 33% to base sheet side laps, ensure lap does not lie within 150 mm (6") of a roof drain.
- .2 Install 1-ply cap sheet membrane fully torched in place using proper application techniques as specified by the membrane Manufacturer. Only certified applicators will be permitted to use torch welding equipment.
- .3 Install membrane by softening both contact surfaces simultaneously with recommended torching equipment. During application, unroll membranes slowly into fluid bitumen ensuring consistent 3 mm (0.125") to 6 mm (0.25") flow protrudes each side of the roll.
- .4 Install membrane true to line and free of wrinkles, air pockets, voids, excessive bitumen flow or other irregularities. Ensure the membrane is not overheated at any location. Should any of these conditions occur, immediately stop membrane application and correct the deficiency before proceeding. Notify Consultant and obtain his approval for proposed repair methods. Questionable areas will require to be cut out and replaced
- .5 Using a torch and trowel, embed granules at end laps and where required on surface of cap sheet to ensure proper bonding of membrane overlaps.
- .6 Carry cap sheet membrane to base of cant strip onto vertical substrate.

Cap Sheet Flashings

- .1 All flashings to be cut across the roll in 1 metre (3'-3") sections. Cut off corners at end laps to be covered by next flashing piece.
- .2 Provide chalk lines and install all membrane true to line. Install base sheet gusset reinforcement at all corner locations.
- .3 Commence flashings from the drain or low points and overlap all side laps minimum 75 mm (3"). Cap sheet flashings to extend 150 mm (6") onto roof surface and terminate as shown in Drawings. At wall locations, unless otherwise specified, cap sheet flashings to extend up 50 mm (2") higher than base sheet flashings.
- .4 Secure flashings at 225 mm (9") o.c. at walls, eaves and parapets as shown on Drawings with nails or screws with 25 mm caps. Cover fasteners with modified sealant.
- .5 Install membrane by softening both contact surfaces simultaneously with recommended torching equipment. During application, unroll membrane slowly into fluid bitumen ensuring consistent 6 mm (0.25") flow protrudes each side of the roll.
- .6 Unroll and work sheet into place using torch, trowel and wet sponge to ensure proper placement and adhesion.

- .7 Install membrane true to line and free of wrinkles, air pockets, voids, excessive bitumen flow or other irregularities. Ensure the membrane is not overheated at any location. Should any of these conditions occur, immediately stop membrane application and correct the deficiency before proceeding. Notify Consultant and obtain his approval for proposed repair methods. Questionable areas will require to be cut out and replaced.
- .8 Touch up bare spots, corners, scuffs and bleedout runs on cap sheet with granules matching membrane colour, immediately following installation. Use hot air welder, torch or modified sealant to adhere granules to sheet.
- .9 Extend cap sheet flashing membrane minimum 150 mm (6") onto cap sheet membrane.

3.11 DRIP FLASHINGS

- .1 Follow Manufacturer's recommendations as to whether pre-finished flashings built into the roof are to be primed. When primer is required, prime top and underside of all drip flashings to be incorporated with roofing prior to application. Primer must be compatible with both membrane and finishes on pre-finished flashing material. Use primer supplied by the membrane Manufacturer. All primer to be dry before proceeding.
- .2 Fabricate and install metal drip flashings built into the roof at locations noted on the Drawings as per Detail and Section 07 62 13. Join flashing with S-lock on face and overlap horizontal joints 50 mm (2"). Mitre and seal inside and outside corners of roof flanges. Seal all overlaps, solid with polyurethane caulking as metal flashing is being installed and clean off any material exposed to view. Avoid contact between caulking and bitumen products.
- .3 Install drip flashing true to line set on top of completed base sheet membrane roofing in continuous strip of Type C sealant. Secure flashings with roofing nails installed in a double staggered row at 150 mm (6") centres. Locate nails no closer than 75 mm (3") from face.
- .4 Coat exterior face of metal with liquid soap. Clean metal of soap and contaminants at conclusion of membrane and flashing installation.
- .5 Install an additional piece of base sheet minimum 150 mm x 150 mm (6" x 6") centered over joints and corners of drip flashing and carried to within 25 mm (1") of edge. Review procedures with the Consultant before proceeding.
- .6 Install 1-ply of base sheet in Type C sealant to 25 mm (1") from drip edge and continuing a minimum of 150 mm (6") beyond flashing flange. Ensure positive bond to all metal as to provide a continuous permanent watertight seal.
- .7 Install 75 mm (3") wide strip of Type C sealant at drip edge, to ensure drippage of bituminous products does not occur, prior to cap sheet installation.
- .8 Install cap sheet as specified and trim flush with outside face with hot roofing knife. Work underlying surfaces with broom, roller or wet sponge as required to obtain a positive continuous permanent watertight seal.

3.12 ROOF ACCESS LADDER SUPPORT

- .1 ARS-500 access ladder support by Thaler Metal Industries where noted on drawings.

3.13 COPPER ROOF DRAINS

- .1 Install new roof drains and overflow roof drains at locations shown on the Drawings.

- .2 Roof drains and overflow roof drains shall be sized as specified by the Mechanical Engineer. Roof drains shall have control flows where specified by the Mechanical Engineer. Provide stainless steel drain guards where specified and/or shown on the Drawings. Coordinate installation of mechanical services with Section 22 00 00 and 23 00 00.
- .3 Cutting of holes through roof deck is by other trades. Confirm location and install opening in deck to Section 07 50 13, Drains and Drainage Plane.
- .4 Install air seal around the drain opening and extend onto deck minimum 150 mm (6") as shown on the Drawings. Overlap vapour barrier onto the air seal a minimum 150 mm (6"). Seal vapour barrier onto the air seal with a continuous layer of rubberized mastic.
- .5 Install sloped insulation sumps around drain to provide positive drainage as specified and/or shown on the Drawings and Roof Plan. Site cut insulation to adjust for drain flanges and clamping ring to ensure water flow will not be impeded. Adjust size and slope of drain sumps as required to suit site conditions.
- .6 Extend separation membrane and cap insulation over tapered insulation sump to the drain as shown on the Drawings.
- .7 Prime and set drain flange in a continuous layer of rubberized mastic. Ensure primer is dry before proceeding.
- .8 Prime drain flange with modified bitumen primer and install specified membrane roofing continuously over the drain sump and flange. Ensure primer is dry before proceeding. Neatly trim felts at drain opening and seal with rubberized mastic.
- .9 Install 1-ply 250 gm/m² modified bitumen cap sheet torched in place, size 1000 mm x 1000 mm (3'-3" x 3'-3"), centered over drain. Neatly trim felts at drain opening and seal with rubberized mastic.
- .10 Where cap insulation is not installed continuously from the field of the roof into the sump, reinforce transition with 1-ply 250 gm/m² modified bitumen cap sheet torched in place. Extend modified membrane 225 mm (9") beyond all sides of tapered insulation sump. Centre first sheet over drain. Neatly trim felts at drain opening and seal with rubberized mastic.
- .11 Install a continuous bead of modified sealant on modified cap sheet membrane, and set clamping ring. Secure clamping ring and integral strainer as dictated by drain design. Tighten bolts to ensure a permanent watertight compression seal. Torque to 13.6 N.m (10 lb ft.) with torque wrench.
- .12 Install test plug, water test roof and repair leaks after mechanical services are connected to drains as specified in Section 22 00 00 and 23 00 00.

3.14

CUSTOM-FABRICATED SCUPPERS AND OVERFLOW SCUPPERS

- .1 Install scuppers and overflow scuppers through eaves and parapet walls as specified and/or as shown on the Drawings.
- .2 Install overflow scuppers on every roof area constructed with only one drain as specified and/or shown on the Drawings.
- .3 Scuppers shall be minimum 200 mm (8") wide.
- .4 Except at overflow scuppers, reduce the insulation thickness to a minimum 25 mm (1") for a distance of 1200 mm (4'-0") from scupper to provide positive drainage and ensure that water flow will not be impeded. Adjust wood blockings and flashings to suit site conditions.

- .5 Install scuppers on top of modified membrane base sheet and prior to the installation of the modified flashings and membrane cap sheet.
- .6 Cut neat hole through base sheet and cant 25 mm (1") larger than specified scupper size to prevent bitumen drippage.
- .7 Install scupper plumb, level and true to line.
- .8 Prime and set flanges in a continuous layer of rubberized mastic. Ensure primer is dry before proceeding.
- .9 Secure flange to the cant at outer edges at a minimum of four locations.
- .10 Prime and flash flange with 1-ply of 180 gm/m² modified bitumen base sheet. Extend base sheet flashing to within 25 mm (1") of the metal upturn and continue 125 mm (5") beyond flange.
- .11 Install specified base sheet flashing, membrane cap sheet, and cap sheet flashing as specified elsewhere in this Section, terminating and cutting neatly at metal upturn.
- .12 Seal junction of metal upturn and membrane with modified sealant. Touch up surface with matching granules.
- .13 Protect exposed surfaces during roofing operation and clean surfaces free of bitumen before leaving site.
- .14 Clean gravel guards free of obstructions following the installation of the flashings.
- .15 Provide new down pipes or water-conductors as specified and/or as shown on the Drawings, to Section 07 62 13.
- .16 Connect new down pipes or water-conductors into existing drainage system or provide surface drainage as specified and/or as shown on the Drawings.
- .17 When surface drainage is specified, install concrete splash pad under downspouts and water-conductors to protect the surface from erosion. Size 600 mm x 600 mm (24" x 24") concrete paver or use oversize pavers as specified. Elevate concrete paver on 50 mm (2") thick polystyrene insulation. Cut insulation 38 mm (1.5") smaller on all sides so paver overhangs and protects insulation from direct sunlight. Underscore the insulation both top and bottom with 19 mm x 19 mm (0.75" x 0.75") drain grooves as shown on the Drawings.
- .18 Install test plug, water test and repair leaks to Section 22 00 00 and 23 00 00.

3.15

PLUMBING VENTS, STACKS AND SLEEVES

- .1 Inspect and clean soil pipes of debris to ensure they are operational.
- .2 Protect exposed surface during roofing operation and clean surfaces free of bitumen before leaving site.
- .3 Make all penetrations air and watertight at vapour retarder by installing flexible membrane flashings 150 mm (6") onto vapour retarder and carry up and around projection. Clamp in place and caulk.
- .4 Trim base sheet at roof projections.
- .5 If pipes are too tall or too low, advise Mechanical Contractor. Adjust existing pipes to new flashing heights by either cutting down or extending pipes with matching materials attached with mechanical couplers. Ensure pipes are 38 mm (1.5") higher than flashing to allow for sealing to prevent condensation. Protect all flashings not to be covered with roofing with heavy paper and masking tape to prevent damage and bitumen stains.
- .6 Clear all projections free of contaminants and seal junction of base sheet and roof projections with trowel applications of sealant as shown on Drawings.

- .7 Install all metal flanges into the membrane before the installation of cap sheet. Insulate sleeves in accordance with Drawings as specified. Install telescoping caps to Detail.
- .8 Prime topside and underside of all flanges to be incorporated with roofing prior to application. Use primer supplied by the membrane Manufacturer. All primer to be dry before installation of membrane roofing or flashing.
- .9 Before installing flashings, install 1-ply base sheet extending to opening. Set flanges in bed of modified sealant and coat top of flange with rubberized mastic prior to membrane installation.
- .10 Install 1-ply of base sheet flashings mopped or adhered to within 25 mm (1”) from upturn and continuing a minimum of 225 mm (9”) beyond flange. Continue cap sheet to metal upturn. Seal around upturn junction with modified sealant and touch up with matching granules.
- .11 Install rain collars over sleeves to match adjoining materials and seal with rubberized mastic, welding or solder, as shown on Drawings. Solder rain collar up to 22 gauge and weld 22 gauge or heavier.
- .12 Remove and replace all damaged flashings and poorly fitting collars. Clean exposed surfaces free of bitumen before leaving site. Paint all sleeves marred with bitumen with two coats of paint to match flashing colour.

3.16

CLEAN UP

- .1 At all times, keep the premises free from accumulation of waste materials or rubbish. Stock piling of debris on the roof will not be permitted.
- .2 Repair defects in surface and bitumen runs with granules to match existing to leave the roof in an even consistent finish.
- .3 Leave roof clear of debris and bitumen left by spills and machine tracking.
- .4 Leave grounds and building free of debris and bitumen spread by pedestrian traffic where applicable.
- .5 Clean surfaces and penetrations of all contaminants and touch up to the satisfaction of the School Board. Include rooftop equipment, curbs, soil stacks, sleeves, gas lines, vents, drains and ladders.
- .6 Check drains to ensure they are functional and where required removal of all debris by vacuum.
- .7 At the completion of the Work remove all rubbish, tools, equipment and surplus materials.
- .8 Be responsible to repair and pay all costs and fees required to rectify damage caused by Work of the Contract with materials and finish to match original.

3.17

CONTRACTOR’S QUALITY CONTROL

- .1 Contractor’s Quality Control shall be completed in accordance with Section 07 52 00.

3.18

INSPECTION AND TESTING

- .1 Field review of the Work will be completed by Fishburn Building Sciences Group Inc. (Consultant).

- .2 Examination of materials' certificates and test reports shall not be construed as relieving the Contractor of his responsibility for proper completion and guarantee of the Work in accordance with the Drawings and Specification.
- .3 Notify the Architect/School Board/Consultant and material Manufacturer at least 48 hours before roofing operations commence, and arrange for a site meeting for discussion of procedure. Subsequently, give two working days prior notice for the commencement of each phase of Work. Notify of delays and re-starts.
- .4 Cooperate with Consultant and afford all facilities necessary to permit full inspection of the Work and testing of materials prior to, during their use and during the warranty period. Act immediately on instructions given. Make cut-out for testing purposes when and where required and **make good** roofing of test areas and of any and all defects of materials and workmanship without additional cost.
- .5 Do not conceal or cover any phase of the Work until after it has been inspected and approved.
- .6 Inspection of the Contract Documents as to extent of Work, quality of workmanship and materials, methods, etc. is the responsibility of the Architect.

3.19

NON-COMPLIANCE WITH INSPECTIONS AND TESTS

- .1 If the initial inspection and tests required to establish compliance with the Contract Documents indicates non-compliance with the Contract Documents, subsequent tests or re-inspection occasioned by non-compliance shall be performed. The cost of re-inspection and testing will be borne by the Contractor and deducted from the price of the Contract.
- .2 The Contractor shall replace or correct defective Work not done in accordance with the Contract. If, in the opinion of the Architect, it is not expedient to correct defective Work or Work done in accordance with the Contract, the School Board may deduct from the Contract price the difference in value between the Work as done and called for by the Contract, the amount of which will be determined by the Architect.
- .3 Replace all Work that results from inferior products or workmanship

END OF SECTION

GENERAL

1.1 Section Includes

1. Section includes for provision of all labour, materials, equipment and services for sheet metal flashing and trim Work in accordance with Contract Documents.

1.2 Related Sections

1. Section 06 10 00 Rough Carpentry
2. Section 07 52 16 SBS Modified Bituminous Membrane Roofing
3. Section 07 92 00 Joint Sealers

1.3 References

1. Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA) – Architectural Sheet Metal Manual
2. ASTM A 525M, Standard Specification for Sheet Steel, Zinc Coated (Galvanized) by the Hot Dipped Process, General Requirements.
3. Canadian Roofing Contractors Association (CRCA) – Specification Manual
4. Canadian Sheet Steel Building Institute (CSSBI) Bulletin No. 9, Core and Maintenance of Pre-finished Sheet Steel Building Products.

1.4 Operations

1. Perform operations, at times designated by the School Board, that will not adversely affect occupants of building and operations in and around site access and egress.

1.5 Protection

1. Protect work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned, shall be replaced at no cost to School Board.

1.6 Submittals

1. Submit samples of flashing and sheet metal type and colour to Consultant and School Board for review prior to commencing work.

1.7 Mock-Up

1. Fabricate mock-ups in minimum 2440 mm (8 ft.) lengths with reviewed materials, approved methods including, joints, seams, expansion joints, starter strips and fasteners.
2. Mock-up, if accepted, shall represent the minimum standard for work. Mock-up may be included as part of final work

1.8 Quality Assurance

1. Flashing and Sheet Metal Work shall be executed in accordance with SMACNA Architectural Sheet Metal Manual - 1993 (Addendum No. 1 – October 31, 1997), by skilled trades having a minimum of five (5) years related experience.

1.9 Warranty

1. Provide minimum two (2) year Warranty from date of Substantial Performance, as certified by Consultant. Warranty shall be submitted against defects in workmanship and materials.
2. *Contractor* must extend the Warranty on replaced parts and workmanship for a period of two (2) years from date of acceptance of replacement parts and workmanship. Defects will include but will not be limited to leaking, failure to stay in place, lifting, deformation and breaking of weathertight seals.
3. Provide all additional Warranties that may be available from manufacturer.

1. PRODUCTS

2.1 Material

1. Prefinished steel sheet: Galvanized steel, 0.71 mm (24 gauge) core nominal thickness, conforming to ASTM A525, Z275 zinc coated (galvanized) to designation G90 by the hot dip process, with a prefinished coat. Profiles as detailed.
2. Precoat Finish: Perspectra Plus Series, factory applied coating. Colour to be approved by School Board from standard colours listed in General Colour Card.
 1. Four standard (4) colours – to be selected from full colour selection by architect.
3. Starter strips: Fabricated from prefinished steel sheet, 0.87 mm (22 gauge) core nominal thickness. Minimum 75 mm (3 in.) wide face or as detailed and to be continuous.
4. Termination Bar: 3 mm x 25 mm (1/8 x 1 in.) extruded aluminum bar.
5. Touch-up paint: As supplied and recommended by sheet steel manufacturer.
6. Exposed Sheet Metal Fasteners: Self-Drilling Hex Head with washer and colour coded cap.
7. Cap, Counter and Fascia Metal to be fabricated to layouts and details shown on drawings and to extent required.
8. Overflow Scuppers: Overflow (Where Shown on Drawings): Fabricated from 0.71 mm (24 gauge) stainless steel. To be a minimum 200 mm wide x 100 mm high (8 x 4 in.) with continuously soldered seams with a 150 mm (6 in.) wide apron/flanges.
9. Fasteners: In accordance with Section 06 10 00 – Rough Carpentry
10. Sealants: In accordance with Section 07 92 00 – Joint Sealers

2. EXECUTION

3.1 Fabrication

1. Shop fabricate flashing, sheet metal and trim in accordance with requirements of SMACNA and the Contract Documents. Form sheet metal on bending brake, shaping, trimming and hand seaming on bench.
2. Form sections square, true, and accurate to size. Flashings shall be free from distortion, oil canning, twists, buckles, discolouration and other defects detrimental to appearance and performance.
3. Double back all edges a minimum of 13 mm (1/2 in.). Raw cut-edges are not acceptable.
4. Form joints with S-locks and make allowances for movement. Mitre and form standing seams at all corners. Make allowance for movement at joints.
5. Fabricate cap flashings, counter flashings and starter strips to details shown and where required.
6. Fabricate metal in 2400 mm (8 ft.) maximum lengths with an unbroken face less than 225 mm (9 in.). Form flashings with an exposed unbroken face exceeding 225 mm (9 in.) and a girth greater than 610 mm (24 in.) in 1220 mm (4 ft.) maximum lengths.
7. Provide horizontal stiffening rib “V” on all face metal exceeding 225 mm (9 in.) in girth and where shown on drawings.
8. Provide an ‘S-Lock’ joint at all end joints and at all horizontal joints between the cap flashing and the vertical flashing and between the vertical flashing and base counter flashing.
9. Where soldered joints are absolutely necessary and where approved for use in prepainted metal, clean paint off both surfaces before soldering for minimum area necessary.
10. Exposed sheet metal coming in contact with a metal of a different type must be back painted with two (2) coats of isolation coating.

3.2 Sheet Metal Flashing and Trim

1. Provide a continuous starter strip on exterior side for all metal cap, fascia and counter flashings and secure at a maximum 305 mm (12 in.) on centre with flat headed screws.
2. Install flashings and sheet metal that includes but not limited to; cap flashings, counter flashings, curb and sleeper counter flashings, starter strips and other miscellaneous trim work in accordance with Contract Documents.

3. Parapet and perimeter cap flashings shall be installed with a **minimum 10% positive slope** to interior of roof. Slope to be provided by installation of continuous wood shims, plywood and wood blockings as detailed and in accordance with Section 06 10 00 – Rough Carpentry.
4. Saw cut new reglet, minimum 13 mm high x 25 mm deep (1/2 in. x 1 in.) into masonry surfaces to accommodate installation of sheet metal counter flashings.
5. Return top edge of metal counter flashings into reglet 19 mm (3/4 in.). Secure flashings with pin grips spaced at maximum 305 mm (12 in.) on centre and apply sealant bead to shed water.
6. Install sheet metal work with concealed fasteners. Install exposed fasteners only when and where permitted by Consultant. Install fasteners in an approved manner as to prevent water penetration at point of fastening and to be evenly and neatly distributed.
7. Provide continuous termination bar at top edge of membrane flashings. Fasten termination bar to substrate at a maximum 305 mm (12 in.) on centre with appropriate and approved fasteners. Top edge of counter flashing shall be inserted under cap flashings.
8. Fasteners are to be located minimum of 305 mm (12 in.) above roof membrane – where possible.
9. End joints of adjacent lengths shall be completed using ‘S-Lock’ joints. This shall be accomplished by inserting end of one length in a 25 mm (1 in.) deep "S" lock formed in end of adjacent length. Concealed portion of "S" lock shall extend 25 mm (1 in.) outwards and shall be secured to substrate with flat head screws at 100 mm (4 in.) on centre.
10. Provide three (3) exposed fasteners on interior side of cap flashing, evenly spaced at 610 mm (24 in.) per 2400 mm (8 ft.) length. Use colour ceded screws with washers.

3.3 Overflow Scuppers

1. Where indicated on drawings, install new scuppers and secure to substrate. Overflow scuppers shall be set no higher than 50 mm (2 in.) above lowest point of roof area.
2. Flash in scupper flanges in accordance with Section 07 52 16 SBS Modified Bituminous Membrane Roofing

3.4 Clean-up

1. Remove all excess materials, debris, tools and equipment as work proceeds and on completion, or sooner if requested b Consultant.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S101, 1989.
 - .2 CAN/ULC-S102, 1988.

1.2 TEST REPORTS

- .1 Submit product data including certified copies of test reports verifying fireproofing applied to substrate as constructed on project will meet or exceed requirements of Specification.
- .2 Submit test results in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.
- .3 For assemblies not tested and rated, submit proposals based on related designs using accepted fireproofing design criteria.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 300 x 300 mm size sample of exposed fireproofing for approval of texture and colour.

1.4 PROTECTION

- .1 At outdoor temperatures less than 5EC, ensure that a 5EC air and substrate temperature is maintained during and for 24 hours after application. Ensure that natural ventilation to properly dry the fireproofing during and subsequent to its application is provided. In enclosed areas lacking openings for natural ventilation, ensure that interior air is circulated and exhausted to the outside.
- .2 Provide temporary enclosures to prevent spray from contaminating air beyond application area.
- .3 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of fireproofing materials.

Part 2 Products

2.1 MATERIALS

- .1 **Sprayed fireproofing:** ULC certified cementitious or fireproofing qualified for use in ULC Designs to provide 1 hour fire resistance rating to **all floor supporting structural steel members**. Contractor to state ULC Design compliance in data submissions in accordance with Section 01 33 00 – Submittals.

- .1 Acceptable Material: “W.R. GRACE”, Type MK-6.
- .2 Acceptable Material: “CAFCO/ISOLATEK INTERNATIONAL” Type LD-C/F or Type 300,5B OR 400.
- .3 Acceptable Material: AD Fire Protection systems, AD Type 5.
- .2 Curing compound: type recommended by fireproofing manufacturer, qualified for use in ULC Designs specified.
- .3 Sealer: type recommended by fireproofing manufacturer, qualified for use in ULC Design specified.

Part 3 Execution

3.1 PREPARATION

- .1 Discuss fireproofing methods and final product with principal building inspector prior to application to ensure that finished installation will be acceptable. Record in writing all materials and methods to be employed to achieve final approval of installation.
- .2 Substrate shall be free of material, which would impair bond.
- .3 Verify that painted substrates are compatible and have suitable bonding characteristics to receive fireproofing.
- .4 Remove incompatible materials.
- .5 Ensure that items required to penetrate fireproofing are placed before installation of fireproofing.
- .6 Ensure that ducts, piping, equipment, or other items which would interfere with application of fireproofing are not positioned until fireproofing work is completed.

3.2 APPLICATION

- .1 Apply bonding adhesive or primer to substrate if recommended by manufacturer.
- .2 Apply fireproofing to correspond with tested assemblies, or acceptable calculation procedures to provide following fire resistance ratings.
- .3 Apply fireproofing over substrate, building up to required thickness to cover substrate with monolithic blanket of uniform density and texture.

3.3 INSPECTION AND SITE TESTS

- .1 Inspection and testing of fireproofing will be carried out by Testing Laboratory designated by Consultant.
- .2 Cost of testing will be paid from Cash Allowance specified in Section 011100 – Summary of Work, section 1.29.
- .3 Arrange for final inspection of the work of this section by municipal building inspector.

3.4 PATCHING

- .1 Patch damage to fireproofing caused by testing or by other trades before fireproofing is concealed, or if exposed, before final inspection.

3.5 LOCATIONS- SPRAYED FIREPROOFING

- .1 Fireproofing is required on all structural steel supporting floor loads. Refer to structural drawings.

END OF SECTION

Part 1 General

1.1 RELATED WORK

- .1 Fire stopping and smoke seals within mechanical assemblies (i.e. inside ducts, dampers) and electrical assemblies (i.e. inside cable trays) are specified in Division 26 and 33 respectively.

1.2 REFERENCES

- .1 Underwriters Laboratories of Canada (ULC)
 - .1 ULC-S115, Fire Tests of Firestop Systems.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 300 x 300 mm samples showing actual firestop material proposed for project.

1.4 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

1.6 SYSTEM DESCRIPTION

- .1 Firestopping Materials: CAN4-S115M ASTM E814 to achieve a fire protection rating as noted on Drawings.
- .2 It is the intent of this Section that in conjunction with Divisions 26 and 33 a competent, single source be responsible for the firestopping and smoke seals of the entire project.

1.7 QUALITY ASSURANCE

- .1 Manufacturer: Company specializing in manufacturing products of this Section with minimum five years documented experience.
- .2 Applicator: Approved, licensed and supervised by the manufacturer of firestopping materials. Company with minimum five years documented experience.
- .3 Product: Manufactured under ULC Follow-up Program. Each container or package shall bear ULC label.

1.8 REGULATORY REQUIREMENTS

- .1 Conform to applicable code for fire protection ratings.
- .2 Provide certificate of compliance for authority having jurisdiction indicating approval.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store materials in a dry, protected area, off ground in original, undamaged, sealed containers with manufacturer's labels and seals intact.

1.10 PROJECT AND SITE CONDITIONS

- .1 Application temperature and ventilation as per Manufacturer's instructions.

1.11 SEQUENCING AND SCHEDULING

- .1 Sequence work to permit installation of firestopping and smoke seal materials to be installed after adjacent work is complete and before closure of spaces.

Part 2 Products

2.1 MATERIALS

- .1 A/D Firebarrier Firestop Systems, by A/D Fire Protection Systems Inc., capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN4-S115 and not to exceed opening sizes for which they are intended.
- .2 Mineral Wool Backing Insulation: ULC labeled, preformed non-combustible material (A/D Firebarrier Mineral Wool) by A/D Fire Protection Systems Inc.
- .3 Retainers: Clips to support mineral wool.
- .4 Firestopping Sealant: ULC labeled, single component silicone based, A/D Silicone Firebarrier Sealant by A/D Fire Protection Systems Inc.
- .5 Firestopping Seal: ULC labeled, single component water-based seal, A/D Firebarrier Seal by A/D Fire Protection Systems Inc.
- .6 Firestopping Foam: ULC labeled, two components silicone foam, A/D Firebarrier RTV Foam by A/D Fire Protection Systems Inc.
- .7 Firestopping Mortar: ULC labeled, non-combustible fibre reinforced, foamed cement mortar, A/D Firebarrier Mortar by A/D Fire Protection Systems Inc.
- .8 Damming Material: In accordance with tested assembly being installed as applicable and as acceptable to authorities having jurisdiction.

Part 3 Execution

3.1 PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.
- .5 Verify that openings are ready to receive the Work of this Section.
- .6 Confirm compatibility of surfaces to receive firestopping and smoke seal materials.
- .7 Beginning of installation means acceptance of existing surfaces and substrate.

3.2 INSTALLATION

- .1 Install firestopping in wall cavities in accordance with the OBC 3.1.11., in cavities 25mm and greater, spaced 3.0m max. vertically and 20m max. horizontally.
- .2 Install fire stopping and smoke seal material and components in accordance with ULC certification and manufacturer's instructions.
- .3 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .4 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .5 Tool or trowel exposed surfaces to a neat finish.
- .6 Remove excess compound promptly as work progresses and upon completion.
- .7 Apply in sufficient thickness to achieve rating to uniform density and texture.
- .8 Protect installed material until cured or set.

3.3 INSPECTION

- .1 Notify Consultant when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.

3.4 SCHEDULE

- .1 Firestop and smoke seal at:

- .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
- .2 Top of fire-resistance rated masonry and gypsum board partitions.
- .3 Intersection of fire-resistance rated masonry and gypsum board partitions.
- .4 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
- .5 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
- .6 Openings and sleeves installed for future use through fire separations.
- .7 Around Mechanical and Electrical assemblies penetrating fire separations.
- .8 Refer to Drawings for horizontal and vertical fire stop locations and for typical firestopping detail at cavity wall, for top of wall fire separation assembly and for fire separation locations.

3.5 CLEAN UP

- .1 Remove excess materials and debris and clean adjacent surfaces immediately after application.
- .2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END OF SECTION

1. GENERAL

1.1 Section Includes

1. Section includes for provision of all labour, materials, equipment and services for joint sealers in accordance with Contract Documents.

1.2 Related Sections

1. Section 06 10 00 Rough Carpentry
2. Section 07 52 16 SBS Modified Bituminous Membrane Roofing
3. Section 07 62 00 Sheet Metal Flashing and Trim

1.3 References

1. Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualifications Board for Joint Sealant.
2. CAN/CGSB-19.24 - Multi-Component, chemical curing sealing compound.
3. CAN/CGSB-19.13 - Single Component, elastomeric, chemical curing sealing compound.
4. CGSB 19-GP-14 - Sealing Compound, One-Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

1.4 Operations

1. Perform operations, at times designated by the *Owner*, that will not adversely affect occupants of building and operations in and around site access and egress.

1.5 Protection

1. Protect work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned, shall be replaced at no cost to *Owner*.

1.6 Submittals

1. Submit samples of sealant type and colour to *Consultant* and *Owner* for review prior to commencing work.

1.7 Quality Assurance

1. Skilled trades with minimum five years related experience shall execute Work.

1.8 Mock-Up

1. Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, sealant and tooling. Mock-up may be included as part of finished work.

1.9 Warranty

1. Provide minimum two (2) year Warranty from date of Substantial Performance, as certified by *Consultant*. Guarantee shall be submitted against defects in workmanship and materials.

2. *Contractor* must extend Warranty on replaced parts and workmanship for a period of two (2) years from date of acceptance of replacement parts and workmanship. Defects will include but will not be limited to; joint leakage, hardening, cracking, crumbling, melting, bubbling, shrinkage, running, sagging, change of colour, loss of adhesion, loss of cohesion and staining of adjoining or adjacent materials on surfaces.
3. Provide all additional Warranties that may be available from manufacturer.

1.10 Environmental Requirements

1. Conform to manufacturer's recommended temperatures, relative humidity and substrate moisture content for application and curing of sealants.
2. Materials must be stored at minimum of 20°C (68°F) immediately prior to application. Sealant applications must be carried out when ambient temperature is above 0°C (32°F).

2. PRODUCTS

2.1 Material

1. All materials in a sealant system shall be compatible with each other and with substrate.
2. Colour(s) of sealants shall be selected to match adjacent substrate and shall be approved by *Consultant* or *Owner*.
3. Elastomeric Sealants: One part elastomeric, non-sag urethane based sealant, for masonry to masonry, masonry to metal junctions. Acceptable Material:
 1. Dymonic as manufactured by Tremco Incorporated.
 2. Precast Wall (Vertical Joints) - Three-component, chemically curing, epoxidized polyurethane sealant, 'Dymeric 240' by Tremco Incorporated.
4. Silicone sealants: Silicone based sealant, for metal to metal junctions. Acceptable Material:
 1. Spectrum 2 as manufactured by Tremco Incorporated.
 2. Dow Corning 999-A Silicone Building & Glazing Sealant by Dow Corning Canada Inc. Colour to match adjacent surfaces.
 3. DOWSIL983 Structural Glazing Sealant by Dow Corning Canada Inc.

5. Butyl sealants: Butyl rubber and polyisobutylene blend sealant. Butyl sealant to be compatible with modified bituminous membrane flashings. Acceptable Material:
 1. Tremco Butyl Sealant as manufactured by Tremco Incorporated.
 2. Modified Membrane manufacturer's approved sealant.
6. Joint Backing: Polyethylene, urethane, neoprene or vinyl, extruded foam recommended by the sealant manufacturer. Circular shape with diameter 25% greater than joint width before installation.
7. Void Filler: Glass fibre insulation with a nominal density of 14 kg/m³ (Sized for 25% compression).
8. Primer: As recommended by sealant manufacturer to assure adhesion of compound and to prevent staining of substrate materials.
9. Joint Cleaner: Non-corrosive and non-staining type, compatible with joint forming materials and sealant as recommended by sealant manufacturer.
10. Bond Breaker Tape: Polyethylene bond breaker tape, which will not bond to sealant.

3. EXECUTION

3.1 Preparation

1. Clean joint surfaces of: dust, oil, grease, oxidation, millscale, coatings and all other loose and deleterious material by cutting, brushing, scrubbing, scraping and grinding of substrate that may impair work.
2. Examine joint sizes and conditions to establish correct depth to width ratio for joint backing and sealant.
3. Rake out joints, cracks and crevices to receive sealant, to a depth measuring half the joint width. Provide new reglets at all masonry mortar joints to receive metal counter flashing and sealant.
4. Ensure joint surfaces are dry and frost free. Prepare substrate as recommended by sealant manufacturer ensuring adjacent surfaces are not damaged.
5. Commencement of Work implies acceptance of existing conditions and assuming full responsibility for finished condition of the Work.

3.2 Priming

1. To prevent staining, mask adjacent surfaces prior to priming and caulking.
2. Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.3 Sealant Application

1. Install joint backing all joints prior to applying sealants. Diameter of backing material shall be 25% more than width of joint.
2. **Maintain minimum 2:1 width to depth ratio for sealant.**
3. Apply bond breaker tape where joints are of insufficient size to install joint backing or at 90° junctions or where required by sealant manufacturer or *Consultant*. Ensure bond surface area meets the minimum required size recommended by sealant manufacturer.
4. Apply sealant in continuous beads, in solid contact to underlying surfaces with sufficient pressure to fill voids and joints solid.
5. Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets and embedded impurities. Superficial skin bead is not acceptable.
6. Tool exposed surfaces before skinning occurs to attain concave shape using approved tools.
7. Cure sealant in accordance with the manufacturer's requirements. Do not cover up sealants until proper curing has taken place.

3.4 Clean-up

1. Clean adjacent surfaces immediately and leave work neat and clean.
2. Remove excess and droppings using recommended cleaners as work progresses.
3. Remove bonding tape after initial set of sealant.
4. Remove all excess material, debris, tools and equipment as work proceeds and on completion, or sooner if requested by *Consultant*.

End of Section 07 92 00

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 07 92 10 - Joint Sealing: Caulking of joints between frames and other building components.
- .3 Section 08 71 10 - Door Hardware - General: Supply of finish hardware, including weatherstripping and mounting heights.
- .4 Section 09 91 23 - Interior Painting.
- .5 Section 09 91 13 - Exterior Painting.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A653/A653M-01a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM B29, Specification for Refined Lead.
 - .3 ASTM B749-97, Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
 - .2 CGSB 41-GP-19Ma-84, Rigid Vinyl Extrusions for Windows and Doors.
- .3 Canadian Standards Association (CSA International)
 - .1 G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA W59, Welded Steel Construction (Metal Arc Welding) (Metric Version).
- .4 Canadian Steel Door Manufacturers' Association, (CSDMA).
 - .1 CSDMA, Specifications for Commercial Steel Doors and Frames.
 - .2 CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors.
- .5 National Fire Protection Association (NFPA)
 - .1 NFPA 80, Standard for Fire Doors and Fire Windows.
 - .2 NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
- .6 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN4-S104, Fire Tests of Door Assemblies.
 - .2 CAN4-S105, Fire Door Frames Meeting the Performance Required by CAN4-S104.

- .7 CAN/ULC-S701, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .8 CAN/ULC-S702, Thermal Insulation, Mineral Fibre, for Buildings.
- .9 CAN/ULC-S704, Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.3 DESIGN REQUIREMENTS

- .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35°C to 35°C.
- .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.

1.4 WORK INCLUDED

- .1 A single manufacturer shall fabricate products included within the scope of this Section.
- .2 Manufacturer shall be a member in good standing of the Canadian Steel Door Manufacturers Association (CSDMA).
- .3 Supply only of steel frame products including frames, transom frames, sidelight and window assemblies with provision for glazed, paneled or louvered openings, fire labeled and non-labeled, as scheduled or detailed by the Consultant.
- .4 Supply only of flush steel doors with provision for glazed, paneled or louvered openings, insulated and un-insulated, fire labeled, with or without temperature rise ratings and non-labeled, as scheduled or detailed by the Consultant.
- .5 Supply only of steel panels, similar in construction to steel doors, with flush or abetted bottoms for steel frames, transom frames, sidelight and window assemblies, fire labeled and non-labeled, as scheduled or detailed by the Consultant.

1.5 RELATED WORK

- .1 Building-in of frame product into unit masonry, previously placed concrete, structural or steel or wood stud walls.
- .2 Supply and installation of wood, plastic or composite core doors.
- .3 Supply and installation of builders' hardware except as specified for acoustic assemblies.
- .4 Drilling and tapping for surface mounted or non-templated builders' hardware.
- .5 Caulking of joints between frame product and other building components.
- .6 Supply and installation of gaskets or weather-strip.
- .7 Supply and installation of louvers or vents.
- .8 Supply and installation of glazing materials.

- .9 Site touch-up and painting.
- .10 Wiring for electronic or electric hardware.
- .11 Field measurements.
- .12 Fasteners for frame product in previously placed concrete, masonry or structural steel.
- .13 Steel lintels, posts, columns or other load-bearing elements.
- .14 Field welding.

1.6 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, or louvred, arrangement of hardware and fire rating and finishes.
- .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing and fire rating finishes.
- .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .5 Submit test and engineering data, and installation instructions.

1.7 REQUIREMENTS

- .1 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104M for ratings specified or indicated.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Divert unused paint and sealant materials from landfill to official hazardous material collections site approved by Consultant.
- .3 Do not dispose of unused paint and sealant materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .5 Damaged or broken glazing materials are not recyclable. These materials must not be disposed of with materials destined for recycling.

1.9 TESTING AND PERFORMANCE

- .1 Door constructions covered by this specification shall be certified as meeting Level “A” (1,000,000 cycles) and Twist Test Acceptance Criteria (deflection not to exceed 6.4 mm /13.6kg force, total deflection at 136.1kg force not to exceed 63.5 mm and permanent deflection not to exceed 3.2 mm) when tested in strict conformance with ANSI-A250.4-1994. Test shall be conducted by an independent nationally recognized accredited laboratory.
- .2 Fire labeled product shall be provided for those openings requiring fire protection and temperature rise ratings, as determined and scheduled by the Architect. Doors, frames, transom frames and sidelight assemblies shall be tested in strict accordance with CAN4-S106. Product shall be listed by Underwriters Laboratories of Canada under an active Factory Inspection Program and shall be constructed as detailed in Follow-Up Service procedures issued to the manufacturer.
- .3 Should any door or frame specified by the Architect to be fire rated, not qualify for labeling due to design, hardware, glazing or any other reason, the Consultant shall be so advised before manufacturing commences.
- .4 Core materials for exterior doors shall attain a thermal resistance rating of RSI 1.06 (R6.0) when tested in accordance with ASTM C177 or ASTM C518.
- .5 Product shall be manufactured by a firm experienced in the design and production of standard and custom commercial steel door and frame assemblies, the integration of builders’ or electronic hardware and glazing materials and their impact on the scope of work.
- .6 Manufacturer shall be assessed and registered as meeting the requirements of Quality Systems under ISO 9001.
- .7 Product quality shall meet standards set by the Canadian Steel Door Manufacturers Association.

1.10 TEST REPORTS

- .1 All alternates to this specification shall be submitted to the Architect for acceptance ten (10) days prior to bid date, complete with test reports from independent, nationally recognized testing authorities, certifying that:
 - .1 Steel door and frame assemblies furnished under this section meet the acceptance criteria of ANSI-A250.4-1994, Level “A”.
 - .2 Insulated door cores furnished in exterior doors under this Section meet the specified thermal resistance rating.
- .2 All reports shall include name of testing authority, date of test, location of test facility, descriptions of test specimens, procedures used in testing and indicate compliance with acceptance criteria of the test.

1.11 WARRANTY

- .1 All steel door and frame product shall be warranted from defects in workmanship for a period of one (1) year from date of shipment.

- .2 All steel door and frame product shall be warranted against rust perforation for a period of ten (10) years when the installed and finish painted with a commercial quality paint to the manufacturers recommendations.
- .3 Finish paint adhesion on all door and frame product shall be warranted for a period of ten (10) years when the product has been properly cleaned and finish painted with a commercial quality paint applied as recommended by the paint manufacturer. This warranty shall not exceed that provided by the paint manufacturer.

Part 2 Products

2.1 MATERIALS

- .1 Doors shall be fabricated from tension leveled steel to ASTM A924-M97, galvanized to ASTM A653-M97, Commercial Steel (CS), Type B, coating designation ZF75, known commercially as paintable Galvanneal.
 - .1 Acceptable Manufacturer: Flemming
 - .2 Acceptable Alternate Manufacturer: Trillium Steel Doors Limited, or others meeting these exact specifications outlined in this section and accepted in writing during the tender period.
- .2 Door Cores:
 - .1 Honeycomb:
 - .1 Structural small cell (25.4 mm maximum) kraft paper “honeycomb”.
Weight: 36.3 kg per ream (minimum), density: 16.5 kg/m³ (minimum), sanded to the required thickness.
 - .2 Polystyrene:
 - .1 Rigid extruded, fire retardant, closed cell board, density 16kg/m², thermal values: RSI 1.06 minimum, conforming to ASTM C578.
 - .3 Temperature Rise Rated (TRR):
 - .1 Solid slab core of non-combustible, inorganic composite to limit temperature rise on the “unexposed” side of door to 250°C at 30 or 60 minutes, as required by governing building code requirements and determined and scheduled by the Architect.
 - .4 Adhesives:
 - .1 Honeycomb Cores and Steel Components: Heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement or ULC approved equivalent.
 - .5 Interlocking Edge Seams:
 - .1 Resin reinforced polychloroprene (RRPC), fire resistant, high viscosity, sealant/adhesive or UL approved equivalent.
 - .6 Polystyrene Cores:
 - .1 Heat resistant, epoxy based, low viscosity, contact cement.
 - .7 Primer:
 - .1 Rust inhibitive touch-up only.

- .8 Exterior Top Caps:
 - .1 Rigid polyvinylchloride (PVC) extrusion.

2.2 DOOR FABRICATION

- .1 This section is based on doors and frames as manufactured by Fleming. Doors and frames by other manufacturers are acceptable subject to be similar to the one specified and meeting the terms of this section.
- .2 Doors shall be swinging, 44.4 mm thick of the types and sizes indicated on the Architect's schedules or drawings.
- .3 Exterior doors shall be lock seam, flush.
- .4 Face sheets for exterior doors shall be fabricated from (16) gauge steel.
- .5 Longitudinal edges of exterior doors shall be fully welded, ground smooth with no visible seams.
- .6 Face sheets of interior doors shall be fabricated from 18 gauge steel, except for heavy traffic doors (noted **HT** in Door Schedule) face sheet to be 16 gauge.
- .7 Longitudinal edge of heavy traffic doors (noted **HT** in Door Schedule) shall be mechanically interlocked, fully welded, ground smooth with no visible seams. Do not fill seams.
- .8 Interior doors shall be stiffened, insulated and sound deadened with honeycomb core laminated under pressure to each face sheet.
- .9 Stiffened, insulated and sound deadened with Fleming's propriety core where Temperature Rise Rated (TRR) fire labeled doors are specified on the Architect's schedules.
- .10 Longitudinal edges of interior doors shall be mechanically interlocked, adhesive assisted with edge seams and tack-welded every 150 mm and filled flush.
- .11 Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.
- .12 Formed edges shall be true and straight with a minimum radius for the thickness of steel used.
- .13 Lock and hinge edges shall be beveled 3 mm in 50 mm unless builders' hardware or door swing dictates otherwise.
- .14 Top and bottom of doors shall be provided with inverted, recessed, 16 gauge steel end channels, welded to each face sheet at 150 mm on center maximum.
- .15 Exterior doors shall be provided with factory installed flush PVC top caps. Fire labeled exterior doors shall be provided with factory installed flush steel top caps.
- .16 Unless ineligible due to design, size, hardware or glazing specified on the Architects' or hardware Suppliers' schedules or details, fire labeled doors shall be provided for those

openings requiring fire protection ratings and temperature rise ratings, as determined and scheduled by the Architect.

- .17 Exterior doors and high traffic doors shall be internally reinforced with 20 gauge continuous; interlocking steel stiffeners at 150mm O.C. max, with voids between stiffeners filled and insulated with 24kg/m³ density loose batt type fiberglass material to suit fully welded design.
- .18 Doors shall be factory blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.
- .19 Doors shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
- .20 Doors shall be factory reinforced only for surface mounted hardware.
- .21 Templated holes 12.7mm diameter and larger shall be factory prepared, except mounting and through bolt holes, which shall be by the contractor responsible for installation on site, at the time of application. Templated holes less than 12.7mm diameter shall be factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.
- .22 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.
- .23 Hinge and pivot reinforcements shall be 10 gauge steel minimum high frequency type reinforcing.
- .24 Hinge reinforcements for acoustic doors and doors in excess of 2450mm rabbet height shall be 10 gauge minimum with each cutout provided with 114.3mm heavy weight (4.6mm) high frequency type.
- .25 Lock, strike and flush bolt reinforcements shall be 12 gauge steel minimum.
- .26 Reinforcements for concealed closers and holders shall be 12 gauge steel minimum.
- .27 For surface mounted hardware, reinforcements shall be 16 gauge steel minimum.
- .28 All pairs of fire labeled doors shall be provided with 12 gauge steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.
- .29 Pairs of doors up to 2450mm x 2450mm, to 1½ hour fire rating maximum shall be provided without astragals. Lock edge seam of such doors shall be tacked-welded and ground smooth. All other fire labeled pairs shall be provided with 12 gauge steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.
- .30 Where electrically or electronically operated hardware is specified on the Architects' schedules or details of the final approved schedule and templates provided by the

hardware supplier, hardware enclosures and/or junction boxes, where indicated on the templates, shall be provided and interconnected with CSA Approved 12.7mm diameter conduit and connectors.

- .31 Prepare doors to receive security door contacts – refer to electrical drawings for locations. Door contacts to be installed at 100 mm from the latch side door edge.

2.3 GLAZING

- .1 Where 6mm thick glazing materials are specified on the Architects schedules or details, doors shall be provided with 20 gauge steel glazing trim and snap-in glazing stops.
- .2 Where other than 6mm glazing is specified on the Architect's schedules or details, doors shall receive 20 gauge steel trim and screw fixed glazing stops. Screws shall be #6 x 32mm oval head scrulox (self-drilling) type at 300mm on center maximum.
- .3 Glazing trim and stops shall be accurately fitted, butted at corners, with removable glazing stops located on the 'push' side of the door.
- .4 Provide fire rated glazing confirming to the requirement for enclosures at all doors and screens located within a fire rated enclosure as noted on "A01 Fire Separation" drawing.

2.4 LOUVER

- .1 Where specified on the Architect's schedules or details, non-labeled doors shall be prepared on accordance with the louver manufacturer's details.
- .2 Where specified on the Architect's schedules or details, fire labeled doors shall be prepared for UL listed sight-proof fusible link louvers in accordance with the louver manufacturer's details.
- .3 Louvers shall be supplied and installed by others.

2.5 FINISHING

- .1 Remove weld slag and splatter from exposed surfaces.
- .2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth uniform surfaces.
- .3 On exposed surfaces where zinc coating has been removed during fabrication, doors shall receive a factory applied touch-up primer.
- .4 Primer shall be fully cured prior to shipment.

2.6 PANELS

- .1 Panels shall be fabricated from the same materials, construction and finished in the same manner as doors as specified in Section 2.1.

2.7 PRIMER

- .1 Touch-up prime CAN/CGSB-1.181.

2.8 PAINT

- .1 Field paint steel doors and frames in accordance with Section 09 91 22 – Painting. Protect weatherstrips from paint. Provide final finish shall be free of scratches or other blemishes.

2.9 FRAMES FABRICATION GENERAL

- .1 Steel:
 - .1 Frame product shall be fabricated from tension leveled steel to ASTM A924-M97, galvanized to ASTM A653-M97, Commercial Steel (CS), Type B, coating designated ZF75, known commercially as paintable Galvanneal.
- .2 Primer:
 - .1 Rust inhibitive touch up only.
- .3 Miscellaneous:
 - .1 Door Silencers: GJ-64, Single Stud rubber/neoprene type
 - .2 Thermal Breaks: Rigid polyvinylchloride (PVC) extrusion
 - .3 Fiberglass: Loose batt type, density: 24kg/m³ (minimum), conforming to ASTM C665.
- .4 General:
 - .1 All steel frame product shall be as manufactured by Fleming of the types, sizes and profiles indicated on the Architects' schedules or details.
 - .2 Exterior frames shall be thermally broken, Fleming *Therma-Frame* Series, fabricated from 16 gauge steel.
 - .3 Exterior frame product shall be supplied profile welded (PW)
 - .4 Interior and exterior sections of thermally broken frames shall be separated by a continuous PVC thermal break.
 - .1 Thermally broken sections shall not be assembled by means of screws, grommets or other fasteners and welds shall not cause thermal transfers between interior and exterior surfaces of the frame sections.
 - .2 Closed sections (mullions and center rails) of thermally broken frames shall be factory insulated with 24kg/m³ loose batt type fiberglass material.
- .5 Insulation of open sections (jambs, heads and sills) on exterior frame product shall be provided and installed by the contractor responsible for installation.
- .6 Interior frames shall be Fleming F-Series, fabricated from 16 gauge steel.
- .7 Interior frame product shall be supplied profile welded (PW)
- .8 Knocked-down and knocked-down drywall frames shall not be acceptable.

- .9 Jambs, heads, mullions, sills and center rails shall be straight and uniform throughout their lengths.
- .10 Frame product shall be square, free of defects, wraps or buckles.
- .11 Corner joints shall be profile welded (PW) (continuously welded on the inside of the profiles' faces, rabbets, returns and soffit intersections with exposed faces filled and ground to a smooth, uniform, seamless surface)"
- .12 Joints at mullions, transom bars, sills or center rails shall be coped accurately, butted and tightly fitted, with faces securely welded, matching corner joint faces.
- .13 All steel mullions will be fabricated from the same materials as specified for the steel frames. Steel mullions will be fabricated as a fully assembled three piece unit consisting of a front, back and full height one piece attachment clip as per Fleming F Series. The attachment clip will completely fill the stop area of the mullion on both sides and span the void between each side forming a grid channel like structure. Mullions used as hinge mullions or strike mullions between doors will be filled with grout by the general contractor either prior to or following installation of the frame. The head of the frame shall have an opening sufficient for the grout to be poured in to the mullion.
- .14 Mullions shall be fabricated with continuous 20 gauge galvaneal steel internal reinforcing clips.
- .15 Frame product shall be fabricated with integral door stops having a minimum height of 16mm.
- .16 Glazing stops shall be formed 20 gauge steel, 16mm height channel, accurately fitted, butted at corners and fastened to frame sections with #6 x 32mm oval head scrulox (self-drilling) type screws at 300mm on center maximum.
- .17 Where required due to site access, as indicated on the Architects' schedules or details, when advised by the contractor responsible for co-ordination or installation, or when shipping limitations so dictate, frame product shall be fabricated in sections for splicing in the field.
 - .1 Field spliced jambs, heads and sills shall be provided with 16 gauge steel splice plates securely welded into one section, extending 100mm minimum each side of splice joint.
 - .2 Field splices at closed sections (mullions or center rails) shall be 16 gauge steel splice angles securely welded to the abutting member. Face of splice angle shall extend 100mm minimum into closed sections when assembled.
 - .3 Field splice joints shall be welded, filled and ground to present a smooth uniform surface by the contractor responsible for installation after assembly.
- .18 Each door opening shall be provided with two (2) temporary steel jamb spreaders welded to the base of the jambs or mullions to maintain proper alignment during shipping and handling. Spreaders shall be removed by the contractor responsible for installation prior to anchoring of frame to floor.

- .19 Each door opening shall be prepared for GJ-64 or equivalent, single stud door silencers, three (3) for single door openings, two (2) for double door openings. Silencers shall be shipped loose for installation by the contractor after finish painting.
- .20 Unless ineligible due to design, size, hardware or glazing specified on the Architects' or Hardware Suppliers' schedules or details, fire labeled frame product shall be provided for those openings required fire protection ratings as determined and scheduled by the Architect.
- .21 Hardware Preparations:
 - .1 Frame product shall be blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templated provided by the hardware supplier.
 - .2 Frame product shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
 - .3 Frame product shall be reinforced only for surface mounted hardware.
 - .4 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.
 - .5 Frames shall be prepared for 114.3mm standard weight hinges (minimum).
 - .6 Hinge and pivot reinforcements shall be 10 gauge steel minimum reinforcing, high frequency type shall be provided.
 - .7 Hinge reinforcements for acoustic frames and frames in excess of 2450mm rabbet height shall be 10 gauge minimum with each cutout provided with 114.3mm heavy weight (4.6mm) high frequency type.
 - .8 Strike reinforcements shall be 16 gauge steel minimum.
 - .9 Reinforcements for surface mounted hardware, concealed closers and holders and flush bolts shall be 12 gauge steel minimum.
 - .10 Mortised cutouts shall be protected with 22 gauge steel minimum guard boxes.
 - .11 Where electrically or electronically operated hardware is specified on the Architects schedules or details or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on templates, shall be provided and inter-connected with CSA Approved 12.7mm diameter conduit and connectors.
 - .12 Prepare frames to receive security door contacts – refer to electrical drawings for locations. Door contacts to be installed at 100 mm from the latch side door edge.
- .22 Anchorage:
 - .1 Frame product shall be provided with anchorage appropriate to floor, wall and frame construction.
 - .2 Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb, except as indicated below.
 - .3 Frame product installed in unit masonry partitions shall be provided with 4.0mm diameter steel wire anchors, 18 gauge steel adjustable stirrup and strap or "T" type anchors as conditions dictate.

- .4 Where frame product is installed prior to construction of the adjacent wall, each jamb shall be provided with 16 gauge steel floor anchors. Each anchor shall be provided with two (2) holes for mounting to the floor and shall be securely welded to the inside of the jamb.
 - .5 Floor anchors for thermally broken exterior frames shall be designed so as not to permit thermal transfers from exterior to interior surfaces of the frame sections.
 - .6 Frame product installed in drywall partitions shall be provided with 20 gauge steel snap-in or “Z” type stud type anchor.
 - .7 Jambs of frames in previously placed concrete, masonry or structural steel shall be punched and dimpled to accept machine bolt anchors, 6.4mm diameter, located not more than 150mm from the top and bottom of each jamb. Anchor preparations and guides shall also be located immediately above or below the intermediate hinge reinforcements and directly opposite on the strike jamb. Each preparation shall be provided with 16 gauge anchor bolt guides.
 - .8 Anchor bolts and expansion shell anchors for the above preparations shall be provided by the contractor responsible for installation.
 - .9 After sufficient tightening of the anchor bolts, the heads shall be welded do as to provide a non-removable application. Welded bolt head and dimple shall be filled and ground to present a smooth uniform surface by the contractor responsible for installation, prior to finish painting.
 - .10 Where indicated on the Architects’ schedules or details, channel extensions shall be provided from the top of the frame assembly to the underside of the structure above. Extensions shall be fabricated from 12 gauge steel formed channel, mounting angles welded to inside of frame head and adjusting brackets. Formed channels, adjusting brackets and fasteners shall be shipped loose. Channels shall be mechanically connected to mounting angles and adjusting brackets with supplied fasteners, on site, by contractor responsible for installation.
- .23 Finishing:
- .1 Remove weld slag and spatter from exposed surfaces.
 - .2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth and uniform surfaces.
 - .3 On exposed surfaces where zinc has been removed during fabrication, frame product shall receive a factory applied touch-up primer.
 - .4 Primer shall be fully cured prior to shipment.

2.10 SIZES AND TOLERANCES

- .1 All sizes and tolerances shall be in accordance with the Canadian Steel Door Manufacturers Association “Recommended Dimensional Standards for Commercial Steel Doors and Frames” as follows:
 - .1 Widths of door openings shall be measured from inside of frame jamb rabbet with a tolerance of +1.6mm, -0.8mm.
 - .2 Heights of door openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame with a tolerance of ± 1.2 mm.
 - .3 Unless builders’ hardware dictates otherwise, doors shall be sized so as to fit the above openings and allow a 3mm clearance at jambs and head. A clearance of

19mm between the bottom of the door and the finished floor (exclusive of floor coverings) shall be provided. Tolerances on door sizes shall be $\pm 1.2\text{mm}$.

- .4 Manufacturing tolerances on formed frame profiles shall be $\pm 0.8\text{mm}$ for faces, door stop heights and jamb depths. Tolerances for throat openings and door rabbet shall be $\pm 1.6\text{mm}$ and $\pm 0.4\text{mm}$ respectively. Hardware cutout dimensions shall be as per template dimensions, $+0.4\text{mm}$, -0 .

2.11 HARDWARE LOCATIONS

- .1 Hardware preparations in frame product shall be as noted below and locations on doors shall be adjusted for clearances specified in 2.4.
- .2 Top of upper hinge preparation for 114.3mm hinges shall be located 180mm down from head, transom mullion or panel as appropriate. The top of the bottom hinge preparation for 114.3mm hinges shall be located 310mm from finished floor as defined in 2.4.3. Intermediate hinge preparations shall be spaced equally between top and bottom cutouts. For dutch door frames, top and bottom hinge locations shall be as above, with the tops of intermediate hinges located at 930mm and 1403mm from finished floor.
- .3 Strike preparations for unit, integral, cylindrical and mortise locks and roller latches shall be centered 950mm from finished floor. Strikes for deadlocks shall be centered at 1200mm from finished floor. Strikes for panic or fire exit hardware shall be located as per device manufacturer's templates.
- .4 Push and/or pulls on doors shall be centered 950mm from finished floor.
- .5 Preparations not noted above shall be as per hardware manufacturer's templates.
- .6 Hardware preparation tolerances shall comply with the ANSI A115 series standards.

Part 3 Execution

3.1 SITE AND PROTECTION OF MATERIALS

- .1 The contractor responsible for installation shall remove wraps or covers from door and frame product upon delivery at building site.
- .2 All materials shall be thoroughly inspected upon receipt and all discrepancies, deficiencies and/or damages shall be immediately reported in writing to the supplier. All damage shall be noted on the carriers' Bill of Landing.
- .3 Contractor responsible for installation shall ensure all materials are properly stored on planks or dunnage in a dry location. Product shall be stored in a vertical position, spaced with blocking to permit air circulation between them. Materials shall be covered to protect them from damage from any cause.
- .4 Contractor shall notify the supplier in writing of any errors or deficiencies in the product itself before initiating any corrective work.

3.2 INSTALLATION GENERAL

- .1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDMA Installation Guide.
- .3 Install doors and frames in accordance with the Door and Hardware Institute “Installation guide for doors and hardware”.
- .4 Set frame product plumb, square, aligned, without twist at correct elevation.
- .5 Frame Product Installation Tolerances:
 - .1 Plumbness tolerance, measured through a line from the intersecting corner of vertical members and the head to the floor, shall be $\pm 1.6\text{mm}$.
 - .2 Squareness tolerance, measured through a line 90^0 from one jamb at the upper corner of the product, to the opposite jamb, shall be $\pm 1.6\text{mm}$.
 - .3 Alignment tolerance, measured on jambs, through a horizontal line parallel to the plane of the wall, shall be $\pm 1.6\text{mm}$.
 - .4 Twist tolerance, measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall, shall be $\pm 1.6\text{mm}$.
- .6 Fire labeled product shall be installed in accordance with NFPA-80.
- .7 Secure anchorages and connections to adjacent construction.
- .8 Brace frame product rigidly in position while building-in. Remove temporary steel shipping jamb spreaders. Install wood spreaders at mid points of frame rabbet height and at floor level to maintain frame widths. Provide vertical support at center of head for openings exceeding 1250mm in width. Remove wood spreaders after product has been built-in.
- .9 Frame product in unit masonry shall be fully grouted in place.
- .10 Install doors maintaining clearances outlined in Section 2.4.
- .11 Install louvers and vents.
- .12 Adjust operable parts for correct clearances and function.
- .13 Steel surfaces shall be kept free of grout, tar or other bonding materials or sealers.
- .14 Any grout or other bonding material shall be cleaned from products immediately following installation.
- .15 Exposed field welds shall be finished to present a smooth uniform surface and shall be touched-up with a rust inhibitive primer.
- .16 Exposed surfaces that have been scratched or otherwise marred during shipment, installation or handling shall be touched-up with a rust inhibitive primer.
- .17 Finish paint in accordance with Section 099116 and 099123.

- .18 Install glazing materials and door silencers.

3.3 INSPECTION

- .1 In accordance with Section 011100- Summary of Work, upon assignment of an inspection agency the following inspections shall be performed for hollow metal frames, screens and doors:
 - .1 review of shop drawings for compliance with specification
 - .2 shop inspection during production. Should inspection notification not be given suitable to review fabrication, destructive testing of one or more doors will be undertaken either in the shop or on site at no additional cost to the owner. Doors destroyed for invasive inspection shall be replaced as part of the contract price.
- .2 Upon notification of initial door installation, contractor shall notify inspector to witness installation practice and at periodic points for duration of installation period.
- .3 Scope of inspections shall include shop inspection during fabrication & installation and operation of hardware at site.

3.4 FINISH REPAIRS

- .1 Touch up with primer finishes damaged during installation.
- .2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.5 GLAZING

- .1 Install glazing for doors and frames in accordance with Section 08 80 50 - Glazing.

END OF SECTION

DOOR #	ROOM	DOOR									FRAME					REMARKS
		WIDTH	HEIGHT	FIRE	H.T.	TYPE	MAT'L	FIN	GLASS	TYPE	MAT'L	FIN	DC	GLASS		
FIRST FLOOR																
X126B A	COAT ROOM	MATCH EX	MATCH EX	-	-	B	HM	P	TP	1	HM	P		-	REPLACE DOOR AND FRAME TO MATCH EX. SIZE.	
X126B B	COAT ROOM	EX.DOOR						P		EX. FRAME		P			GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.	
X126B C	COAT ROOM	EX.DOOR						P		EX. FRAME		P			GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.	
X126B D	COAT ROOM	EX.DOOR						P		EX. FRAME		P			GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.	
X131 A	KINDERGARTEN	MATCH EX	MATCH EX	-	-	D	HM	P	TP	10	HM	P		TP	REPLACE DOOR AND FRAME TO MATCH EX. SIZE.	
X132 A	RESOURCE ROOM	EX.DOOR						P		EX. FRAME		P			GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.	
X140 A	SUPPLIES & RECEIVING	EX.DOOR						P		EX. FRAME		P			GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.	
X140 B	SUPPLIES & RECEIVING	EX.DOOR						P		EX. FRAME		P			GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.	

DOOR #	ROOM	DOOR								FRAME					REMARKS
		WIDTH	HEIGHT	FIRE	H.T.	TYPE	MAT'L	FIN	GLASS	TYPE	MAT'L	FIN	DC	GLASS	
X140A A	CUSTODIAL OFFICE	EX.DOOR							P		EX. FRAME	P			GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.
X140B A	ELECT. ROOM	EX.DOOR							P		EX. FRAME	P			GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.
A140C A	ELECT. ROOM	950	2150	45 min.	-	A	HM	P	-	1	HM	P		-	
141 A	WASHROOM	950	2150	-	-	A	HM	P	-	1	HM	P		-	
X141 A	CLASSROOM	EX.DOOR							P		EX. FRAME	P			GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.
X143 A	CORRIDOR	EX.DOOR							P		EX. FRAME	P			GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.
X144 A	SPRINKLER	1000	2150	-	-	A	HM	P		1	HM	P		-	THERMALLY BROKEN INSULATED DOOR & FRAME ASSEMBLY, WEATHER STRIPPING.
100 A	VESTIBULE	2x1000	2150	-	H.T.	B	ALUM	ANNO	TP	CW	ALUM	ANNO		TP	B/F DOOR OPERATOR, ELECTRIC SECURITY STRIKE TO OFFICE. COORDINATE DOOR WITH CURTAIN WALL MANUFACTURER. COORD WITH ELEC FOR VIDEO INTERCOM SYSTEM / CARD READER.
100 B	VESTIBULE	2x1000	2150	-	H.T.	B	HM	P	TP	6	HM	P		TP	B/F DOOR OPERATOR

DOOR #	ROOM	DOOR								FRAME					REMARKS
		WIDTH	HEIGHT	FIRE	H.T.	TYPE	MAT'L	FIN	GLASS	TYPE	MAT'L	FIN	DC	GLASS	
102 A	OFFICE	950	2150	-	-	D	HM	P	TP	5	HM	P		TP	
103 A	STAFF ROOM	950	2150	-	-	D	HM	P	TP	1	HM	P		-	
104 A	KITCHEN	950	2150	45 min.	-	C	HM	P	FRG	1	HM	P		-	
104A A	WALK-IN PANTRY	950	2150	-	-	A	HM	P	-	1	HM	P		-	
105 A	WASHROOM	950	2150	-	-	A	HM	P	-	1	HM	P		-	B/F DOOR OPERATOR, PUSH TO LOCK
106 A	LAUNDRY	950	2150	-	-	A	HM	P	-	1	HM	P		-	
107 A	CUST./MECH.	1100	2150	45 min.	-	A	HM	P	-	1	HM	P		-	
108 A	STROLLER STORAGE	950	2150	-	-	D	HM	P	TP	1	HM	P		-	
109 A	INFANT	950	2150	-	-	D	HM	P	TP	1	HM	P		-	
109 B	INFANT	950	2150	-	-	B	ALUM	ANNO	TP	CW	ALUM			TP	B/F DOOR OPERATOR, THERMALLY BROKEN, INSULATED DOOR & FRAME ASSEMBLY, WEATHER STRIPPING. OPERABLE CASEMENT WINDOW.
109A A	STORAGE	950	2150	-	-	A	HM	P	-	1	HM	P		-	
109B A	WR	950	1200	-	-	E	HM	P	-	4	HM	P		-	HALF DOOR
109C A	SLEEPING	950	2150	-	-	B	HM	P	TP	5	HM	P		TP	
110 A	TODDLER	950	2150	-	-	D	HM	P	TP	1	HM	P		-	

DOOR #	ROOM	DOOR								FRAME					REMARKS
		WIDTH	HEIGHT	FIRE	H.T.	TYPE	MAT'L	FIN	GLASS	TYPE	MAT'L	FIN	DC	GLASS	
110A A	WR	950	2150	-	-	A	HM	P	-	7	HM	P		TP	
111 A	TODDLER	950	2150	-	-	D	HM	P	TP	1	HM	P		-	
111A A	WR	950	2150	-	-	A	HM	P	-	7	HM	P		TP	
111B A	STORAGE	950	2150	-	-	A	HM	P	-	1	HM	P		-	
111B B	STORAGE	950	2150	-	-	A	HM	P	-	1	HM	P		-	
111C A	VESTIBULE	950	2150	-	H.T.	B	HM	P	TP	5	HM	P		TP	
111C B	VESTIBULE	950	2150	-	H.T.	B	HM	P	TP	5	HM	P		TP	
111C C	VESTIBULE	950	2150	-	H.T.	B	HM	P	TP	9	HM	P		TP	B/F DOOR OPERATOR, THERMALLY BROKEN, INSULATED DOOR & FRAME ASSEMBLY, WEATHER STRIPPING.
112 A	PRESCHOOL	950	2150	-	-	D	HM	P	TP	1	HM	P		-	
112A A	WR	950	2150	-	-	A	HM	P	-	7	HM	P		TP	
113 A	PRE-SCHOOL	950	2150	-	-	D	HM	P	TP	1	HM	P		-	
113A A	WR	950	2150	-	-	A	HM	P	-	7	HM	P		TP	
113B A	VESTIBULE	950	2150	-	H.T.	B	HM	P	TP	5	HM	P		TP	
113B B	VESTIBULE	950	2150	-	H.T.	B	HM	P	TP	5	HM	P		TP	

DOOR #	ROOM	DOOR								FRAME					REMARKS
		WIDTH	HEIGHT	FIRE	H.T.	TYPE	MAT'L	FIN	GLASS	TYPE	MAT'L	FIN	DC	GLASS	
113B C	VESTIBULE	950	2150	-	H.T.	B	HM	P	TP	9	HM	P		TP	B/F DOOR OPERATOR, THERMALLY BROKEN INSULATED DOOR & FRAME ASSEMBLY, WEATHER STRIPPING.
114 A	CORRIDOR	2x1000	2150	-	-	B	HM	P	TP	3	HM	P		-	REMOVABLE MULLION
F1 A	STAIR F	2x1000	2150	45 min.	HT	C	HM	P	FRG	3	HM	P		-	B/F DOOR OPERATOR, REMOVEABLE MULLION
F1 B	STAIR F	2x1000	2150	-	HT	B	ALUM	ANNO	TP	CW	ALUM	ANNO		-	B/F DOOR OPERATOR, REMOVEABLE MULLION. THERMALLY BROKEN INSULATED DOOR & FRAME ASSEMBLY, WEATHER STRIPPING.
F1 C	STAIR F	2x1000	2150	-	HT	B	ALUM	ANNO	TP	CW	ALUM	ANNO		-	B/F DOOR OPERATOR.THERMALLY BROKEN INSULATED DOOR & FRAME ASSEMBLY, WEATHER STRIPPING.
SECOND FLOOR															
X210 A	CLASSROOM	EX.DOOR						P		EX. FRAME	P				GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.
X210 B	CLASSROOM	EX.DOOR						P		EX. FRAME	P				GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.
X210 C	CLASSROOM	EX.DOOR						P		EX. FRAME	P				GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.
X211 A	CUSTODIAL	EX.DOOR						P		EX. FRAME	P				GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.

DOOR #	ROOM	DOOR								FRAME					REMARKS
		WIDTH	HEIGHT	FIRE	H.T.	TYPE	MAT'L	FIN	GLASS	TYPE	MAT'L	FIN	DC	GLASS	
X212 A	CORRIDOR	EX.DOOR							P	EX. FRAME		P			GRIND AND SMOOTH ALL SURFACES OF THE EXISTING FRAME AND DOOR. CLEAN AND PREPARE SURFACES THOROUGHLY TO ENSURE PROPER ADHESION OF THE NEW PAINT FINISH.
200 A	LEARNING COMMONS	950	2150	-	H.T.	B	HM	P	TP	5	HM	P		TP	
200 B	LEARNING COMMONS	950	2150	-	H.T.	B	HM	P	TP	5	HM	P		TP	
201 A	ELECTRICAL ROOM	950	2150	45 min.	-	A	HM	P	-	1	HM	P		-	
202 A	SEMINAR	950	2150	-	-	B	HM	P	TP	5	HM	P		TP	
203 A	STAFF RESOURCE ROOM	950	2150	45 min.	-	D	HM	P	TP	1	HM	P		-	
203A A	STORAGE	950	2150	-	-	A	HM	P	-	1	HM	P		-	
205 A	RESOURCE	950	2150	-	-	B	HM	P	TP	1	HM	P		-	
206 A	CLASSROOM	950	2150	-	-	D	HM	P	TP	1	HM	P		-	
207 A	CLASSROOM	950	2150	-	-	D	HM	P	TP	1	HM	P		-	
208 A	CLASSROOM	950	2150	-	-	D	HM	P	TP	1	HM	P		-	
209 A	CLASSROOM	950	2150	-	-	D	HM	P	TP	1	HM	P		-	
210 A	CLASSROOM	950	2150	-	-	D	HM	P	TP	1	HM	P		-	

DOOR #	ROOM	DOOR								FRAME					REMARKS
		WIDTH	HEIGHT	FIRE	H.T.	TYPE	MAT'L	FIN	GLASS	TYPE	MAT'L	FIN	DC	GLASS	
211 A	CLASSROOM	950	2150	-	-	D	HM	P	TP	1	HM	P		-	
213 A	BF WR	950	2150	-	-	A	HM	P		1	HM	P		-	B/F DOOR OPERATOR, PUSH TO LOCK
F2 A	STAIR F	2x1000	2150	45 min.	HT	C	HM	P	FRG	3	HM	P		-	REMOVABLE MULLION, ELECTROMAGNETIC HOLD-OPEN

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 61 00 - Common Product Requirements.
- .3 Section 01 78 00 - Closeout Submittals.
- .4 Section 05 50 00 - Metal Fabrications: Metal fabricated framed openings, structural support framing for sloped glazing.
- .5 Section 07 27 10 - Air Barriers - Descriptive or Proprietary.
- .6 Section 07 84 00 - Firestopping: Fire safing between floor edge and curtain wall system.
- .7 Section 07 92 10 - Joint Sealing: System perimeter sealant and back-up materials.
- .8 Section 08 80 50 - Glazing.
- .9 Section 09 91 23 - Interior Painting: Field painting of interior surface of infill.

1.2 REFERENCES

- .1 Aluminum Association Designation System For Aluminum Finishes (AA).
 - .1 DAF 45 , Designation System For Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA).
 - .1 AAMA CW-DG-1, Aluminum Curtain Wall Design Guide Manual.
 - .2 AAMA CW-10, Care and Handling of Architectural Aluminum From Shop to Site.
 - .3 AAMA CW-11, Design Wind Loads for Buildings and Boundary Layer Wind Tunnel Testing.
 - .4 AAMA T1R-A1, Sound Control for Fenestration Products.
 - .5 AAMA 501, Methods of Test for Exterior Walls.
 - .6 AAMA 503, Voluntary Specification for Field Testing of Metal Storefronts, Curtain Wall and Sloped Glazing Systems.
 - .7 AAMA 611, Voluntary Specifications for Anodized Finishes Architectural Aluminum.
 - .8 AAMA 612, Voluntary Specifications, Performance Requirements, and Test Procedures for Combined Coatings of Anode Oxide and Transparent Organic Coatings on Architectural Aluminum.
 - .9 AAMA 2603, Voluntary Specification Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

- .10 AAMA 2604, Voluntary Specification Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
- .3 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A36/A36M, Specification for Carbon Structural Steel.
 - .2 ASTM A123/A123M, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A167, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .4 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .5 ASTM B209, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - .6 ASTM B221, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - .7 ASTM E283, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - .8 ASTM E330, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls, by Uniform Static Air Pressure Difference.
 - .9 ASTM E331, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.
 - .10 ASTM E413, Classification for Rating Sound Insulation.
 - .11 ASTM E1105, Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.
- .4 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB 1.108, Bituminous Solvent Type Paint.
 - .2 CAN/CGSB-12.20, Structural Design of Glass for Buildings.
- .5 Canadian Standards Association (CSA International).
 - .1 CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.
 - .2 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA-S136, North American Specification for the Design of Cold-Formed Steel Structural Members.
 - .4 CAN3-S157, Strength Design in Aluminum.
 - .5 CSA W59.2, Welded Aluminum Construction.
- .6 Environmental Choice Program (ECP).
 - .1 CCD-45, Sealants and Caulking Compounds.
 - .2 CCD-47, Surface Coatings.
 - .3 CCD-48, Recycled Water-Borne Surface Coatings.

- .7 Society for Protective Coatings (SSPC).
 - .1 SSPC - Paint 20 Zinc Rich Coating.
 - .2 SSPC - Paint 25 Alkyd, Zinc Oxide Linseed Oil and Primer for Use Over Hand Cleaned Steel Type 1 and Type 2.

1.3 SYSTEM DESCRIPTION

- .1 Work included: Furnish labour, materials and other services to complete the fabrication and installation of the framing, including all materials and fitments required for the operation of any entrance units included, in the manner, direction and performance shown on the shop drawings and specified herein. Work not included: Structural support of framing, interior trims. Related work specified elsewhere.

1.4 QUALITY ASSURANCE

- .1 Installation crews engaged or provided by the approved supplier shall have proven experience specifically trained and qualified in this work (written proof of minimum of five (5) years employment or service with the window manufacturer or similar manufacturer). Individuals are to be either employees of the manufacturer and/or workers approved by the manufacturer.
- .2 Provide one (1) thoroughly experienced, reliable, qualified and competent foreman in charge of the work to be on site at all times when work is taking place. Individual to be designated in charge from start of activities on site until final deficiencies are complete. Foreman may only be changed by written approval *or request* of the Consultant or School Board.
- .3 Window supplier is to have adequate plant and skilled tradesmen and is known to have manufactured and installed similar windows for a minimum of five (5) years in the Province of Ontario.

1.5 PERFORMANCE REQUIREMENTS

- .1 Structural performance shall be based on CSA standard CAN3-S157 "Strength Design in Aluminum" and a maximum deflection of 1/175 of the span.
- .2 Air infiltration shall not exceed 0.06 cfm/ft² (0.0003 m³/s-m²) when tested in accordance with ASTM E283 at a pressure differential of 6.24 p.s.f. (300 Pa.)
- .3 There shall be no water infiltration when tested in accordance with ASTM E331 with a pressure differential of 15.0 p.s.f. (720 Pa.) Thermally, the grid members shall have a condensation resistance equal to or better than the area along the bottom of a 1" sealed glass unit with standard metal spacer edge construction.
- .4 Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.
- .5 Provide system to accommodate, without damage to components or deterioration of seals:
 - .1 Movement within system.
 - .2 Movement between system and perimeter framing components.

- .3 Dynamic loading and release of loads.
- .4 Deflection of structural support framing.
- .5 Shortening of building concrete structural columns.
- .6 Creep of concrete structural members.
- .6 Vapour seal with interior atmospheric pressure of 25 mm sp, 22 degrees C, 40% RH: No failure.
- .7 Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.
- .8 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.

1.6 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide component dimensions; describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details and water flow diagrams.

1.7 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate system dimensions, framed opening requirements and tolerances, internal millions reinforcement, adjacent construction, anchor details anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required.
- .3 Curtain wall shop drawings are to be approved for structural integrity by a Professional Engineer licensed to design structures in the Province of Ontario. Shop drawings are to bear Engineer's seal of approval.

1.8 SAMPLES

- .1 Drawings and specifications for work of this section are based upon Thermawall 2600 series Curtain Wall system by Alumicor. For all approved products and acceptable alternatives, submit supporting technical literature, samples, drawings and performance data to meet or exceed these specifications.
- .2 Submit two samples 800 x 800 mm in size illustrating prefinished aluminum surface, finish, colour, texture, specified glass units, insulated infill panels, glazing materials illustrating edge and corner.

1.9 DESIGN DATA

- .1 Submit design data in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Provide framing member structural and physical characteristics, calculations, dimensional limitations, special installation requirements.

1.10 TEST REPORTS

- .1 Submit test reports in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit substantiating engineering data, test results of previous tests by independent laboratory which purport to meet performance criteria, and supportive data.

1.11 REGULATORY REQUIREMENTS

- .1 Conform to applicable code for acoustic attenuation, and sound transmission.
- .2 Use the following paragraph for assessing full sized erected assemblies for review of construction, coordination of work of several sections, testing, or observation of operation. A mock-up may also be used for assessing field applied finishes.

1.12 MOCK-UP

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Locate where directed.
- .3 Allow 24 hours for inspection of mock-up Consultant before proceeding with work.
- .4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may not remain as part of finished work.

1.13 PRE-INSTALLATION MEETING

- .1 Convene one week before starting work of this section.

1.14 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, handle and protect materials in accordance with Division 1 requirements.
- .2 Handle work of this section in accordance with AAMA CW-10.
- .3 Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.15 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install sealants when ambient and surface temperature is less than 5 degrees C.
- .2 Maintain this minimum temperature during and after installation of sealants.

1.16 SEQUENCING

- .1 Coordinate work of this section with installation of fire stopping, air barrier placement, vapour retarder placement, flashing placement, installing ductwork to rear of louvers.

1.17 WARRANTY

- .1 Submit a manufacturer's warranty against defects in materials and workmanship covering the components of the window system for a period of ten (10) years. The manufacturer shall supply a non-pro-rated warranty covering labour, materials, tools and equipment to repair and/or replace any materials defects at no additional cost, for a period of ten (10) years including defects or failures due to poor workmanship and installation.
- .2 The supplier shall also submit a warrantee, in accordance with Section 088050-Glazing, for 10 years warranting the sealed units against defects.

1.18 MAINTENANCE DOCUMENTS AND MATERIALS

- .1 Provide 2 copies of data for maintenance and routine cleaning.
- .2 Provide 2 copies of final record reviewed shop drawings for School Board's records.
- .3 Contractor shall supply all accessories as may be required for the operation and performance of the windows system.

1.19 EXTRA MATERIALS

- .1 Provide extra materials of glass units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide protected and packaged in wood crates suitable for storage. Clearly identify each crate.
- .3 Deliver Consultant, upon completion of the work of this section.
- .4 Store where directed by the Consultant.

1.20 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 Products

2.1 MATERIALS

- .1 Drawings and Details are based on Thermawall 2600 series Curtain Wall by Alumicor (2 ½"- 63.5 mm x 149mm & 187mm – incl. glazing & cap).
- .2 Curtainwall to be reinforced within mullion as required for proposed design.
- .3 Must be designed to withstand a wind load of min. 30 psf.
- .4 fixed (non opening) thermally broken anodized aluminum curtain wall system, glazed with tempered, insulating vision glass and tempered spandrel glass.

- .5 Acceptable Materials : Curtain wall systems meeting or exceeding these specifications manufactured by:
 - .1 Alumicor
 - .2 Aerloc Industries
 - .3 Alwind Industries
 - .4 Kawneer Company of Canada
 - .5 Windspec Inc.
- .6 Extrusions shall be 6063 T54 alloy and temper.
- .7 Formed aluminum components shall be sheet of alloy and temper suitable for their purpose and finish.
- .8 Fasteners shall be 300 series stainless steel or 400 series stainless steel cadmium plated and of sufficient size and quantity to perform their intended function.
- .9 Weathering and glazing gaskets shall be extruded, black, closed cell or dense elastomer of durometer appropriate to the function.
- .10 Provide glazed and aluminum spandrel sections where indicated on drawings.
- .11 Provide structural silicone mullions where described on drawings.
- .12 Refer to Section 08 80 50 – Glazing for information on tinted glazing sections. Refer to drawings for locations of tinted glazing.
- .13 Manufacturer / Installer to determine if mullions require internal reinforcement to achieve specified load resistance.

2.2 FINISHES

- .1 BLACK ANODIZED.
 - .1 Exposed aluminum sections shall be given an anodic oxide treatment in accordance with Aluminum Association specification AA-M12C22A34: “Black anodized”.

2.3 FABRICATION

- .1 Fabricate aluminum work in accordance with reviewed shop drawings and manufacturer’s written instructions.
- .2 Fabricate framing from extrusions of size and shape shown on shop drawings.
- .3 Vertical and horizontal members shall be tubular extrusions designed for shear block corner construction.
- .4 All joints shall be accurately machined, assembled and sealed to provide neat weather tight joints. Shielded drainage and pressure equalization vents shall be provided where

required. AH horizontal members shall be sealed to vertical members to provide individual compartments within the system in accordance with the rain screen principle.

- .5 Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- .6 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- .7 Prepare components to receive anchor devices. Install anchors.
- .8 Arrange fasteners and attachments to ensure concealment from view.
- .9 Reinforce framing members for external imposed loads.
- .10 Visible manufacturer's identification labels not permitted.
- .11 Break shapes must be approved by the Consultant prior to use.
- .12 At all curtain wall spandrel panels exposed on interior of building, curtain wall spandrel panels shall be laminated w/ aluminum panel of same pre-finish as mullions with bent edges.
- .13 Provide spandrel panels at locations of exterior light fixtures as shown on elevations. Coordinate with Div. 16 for lighting location and size of openings.
- .14 All perimeter sections to be tubular/closed back sections for continuous adhesion and continuity of building envelope membrane.
- .15 Spandrel panels:
 - .1 Fabricate insulated spandrel panel inner facing of 20 gauge aluminum sheet. Wrap edges with aluminum sheet, enabling installation and minor movement of perimeter seal.
 - .2 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
 - .3 Place insulation within panel, adhered to exterior face of interior panel sheet over entire area of sheet with impale fasteners.
 - .4 Provide integral reinforcing and stiffeners as required to reinforce panel against deflection caused by wind and suction loads.
 - .5 Provide non-metallic spacers as necessary to separate dissimilar metals.
 - .6 Ventilate and pressure equalize the air space outside the exterior surface of the insulation, to the exterior.
 - .7 Arrange fasteners and attachments to ensure concealment from view.
 - .8 Glass panels: Consists of spandrel glass in accordance with Section 08 80 00 to the exterior with insulated backpan to the inside. Interior face of panel to be finished with a pre-finished aluminum sheet of the same grade as the exterior, colour matching the exterior. Insulation thickness shall be as indicated, retained

with stick clips. Seal all joints in shop with high grade butyl sealant, including perimeter seal at backpan. Colour to later selection by Consultant.

- .9 Metal panels: Consists of an exterior prefinished flush aluminum panel with panel stiffeners as required, to match colour of window framing, with insulation core thickness as indicated and galvanized sheet back-pan. Interior face of panel to be finished with a pre-finished aluminum sheet of the same grade as the exterior, colour matching the exterior.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify dimensions, tolerances, and method of attachment with other work.
- .2 Verify wall openings and adjoining air barrier and vapour retarder materials are ready to receive work of this section.

3.2 INSTALLATION

- .1 Framing shall be installed, glazed and adjusted by experienced personnel in accordance with the manufacturer's instructions and approved shop drawings. All items in this section shall be set in their correct location and shall be set level, square, plumb and at proper elevations and in alignment with other work.
- .2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- .3 Provide alignment attachments and shims to permanently fasten system to building structure. Clean weld surfaces; apply protective primer to field welds and adjacent surfaces.
- .4 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.
- .5 Provide thermal isolation where components penetrate or disrupt building insulation.
- .6 Co-ordinate attachment and seal of perimeter air barrier and vapour retarder materials.
- .7 Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- .8 Install fire-safing in areas as indicated.

3.3 FIELD QUALITY CONTROL

- .1 Inspection will monitor quality of installation and glazing.
- .2 Test to ASTM E1105, and AAMA 501.
- .3 Evaluate installed system by thermo-photographic scan.

3.4 ADJUSTING

- .1 Adjust operating sash for smooth operation.

3.5 CLEANING

- .1 Remove protective material from prefinished aluminum surfaces.
- .2 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- .3 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

3.6 PROTECTION

- .1 Protect finished Work from damage.
- .2 Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.”

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 – Final Cleaning.
- .3 Section 08 80 50 – Glazing.
- .4 Section 07 92 10 - Joint Sealing.

1.2 REFERENCES

- .1 American Architectural Manufacturers Association (AAMA).
 - .1 AAMA 611-98, Voluntary Specifications for Anodized Finishes Architectural Aluminum.
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM B209-07, Specification for Aluminum and Aluminum Alloy Sheet and Plate.
 - .2 ASTM B221-08, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-19-GP-14M, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
- .4 Canadian Standards Association (CSA) International
 - .1 CSA-A440-00/A440.1-00, A440-00, Windows / Special Publication A440.1-00, User Selection Guide to CSA Standard A440-00, Windows.

1.3 DESIGN REQUIREMENTS AND PREQUALIFIED WINDOW SUPPLIERS

- .1 Base performance standard: Products to be supplied from the list of acceptable manufacturers listed below shall meet or exceed the following performance standard product upon which this specification is largely based: 970 Series with 1350 Series Vents as manufactured by Alumicor Ltd.
- .2 Acceptable Manufacturers/Suppliers: Aluminum Windows meeting this specification for this project shall be supplied by one of the following pre-approved suppliers:
 - .1 Aerloc Industries; (905) 628-6061
 - .2 Alumicor Ltd.; (416) 745-4222
 - .3 Alwind Industries; (905) 738-4266
 - .4 Kawneer Company of Canada; (416) 755-7751
 - .5 Windspec Inc.; (905) 738-8311
 - .6 Sherwood Windows Ltd.

.7 Aluminum Window Designs Ltd.

Note: All window frames have been drawn to a std. framing depth of 5 1/4".

All curtain wall framing has been drawn to match windows so that curtain wall framing is inset 67 mm from the veneer face. Provide data at drawn sizes to design loads required.

- .3 Design framing and glazing to withstand design loads as per Ontario Building Code with a maximum reflection of 1/200th of clear span.
- .4 Work of this Section must be designed by and bear stamp of a Professional Engineer licensed to design structures in the Province of Ontario certifying their strength and safety.
- .5 By submitting a price for supply and install, the Contractor, for Work to this Section, shall guarantee that he has carried products and pricing from one of the above approved manufacturers.

1.4 PERFORMANCE

- .1 The overall thermal transmittance of fenestration assemblies shall be less than 0.81 Btu. Thermal transmittance for the fenestration shall be determined using ASHRAE 90.1 calculation procedures and shall include the effect of sash, frame, edge effect and spacer for multiple-glazed units.
- .2 Fenestration shall meet CAN/CSA – A440 windows:
 - .1 Air Leakage: A3
 - .2 Water Leakage: B7
 - .3 Wind Load Resistance: C5
 - .4 Condensation Resistance Factor: fixed frame: 60 minimum
 - .5 Glass: 59 minimum
- .3 Window shall also meet the requirements for blocked operation, ease of operation, sash strength, stiffness and resistance to forced entry.
- .4 Submit manufacturer's certificate, certifying compliance with the above-noted requirements.

1.5 QUALITY ASSURANCE

- .1 Installation crews engaged or provided by the approved supplier shall have proven experience specifically trained and qualified in this work (written proof of minimum of five (5) years employment or service with the window manufacturer or similar manufacturer). Individuals are to be either employees of the manufacturer and/or workers approved by the manufacturer.
- .2 Provide one (1) thoroughly experienced, reliable, qualified and competent foreman in charge of the work to be on site at all times when work is taking place. Individual to be designated in charge from start of activities on site until final deficiencies are complete. Foreman may only be changed by written approval *or request* of the Consultant or School Board's.

- .3 Window supplier is to have adequate plant and skilled tradesmen and is known to have manufactured and installed similar windows for a minimum of five (5) years in the Province of Ontario.
- .4 Mock-up: Construct a window mock-up in accordance with Section 01 45 00 – Quality Control. Allow 24 hours for inspection of mock-up by Consultant before proceeding with the Work. When accepted, mock-up will demonstrate minimum standard for this Work. Mock-up may not remain as part of finished Work.

1.6 SUBMITTALS

- .1 Submittals:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Clearly indicate on shop drawings all materials and large scale details for head, jamb and sill as they will be installed in contact with building components for this project, profiles of components, elevations of unit, anchorage details, location of isolation coating, location of insulation to jambs head and sill, drainage locations, description of related components and exposed finishes and fasteners.
 - .3 Show paths of interior drainage and venting.
- .2 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit samples of each window hardware item for Consultant's approval of type, finish and material.
- .3 Certificates: Submit manufacturer's certificate, and test performance data certifying compliance with specification requirements, for:
 - .1 windows
 - .2 finishes.
 - .3 removable self framed insect screens.
 - .4 infiltration/exfiltration rates.
 - .5 thermal transfer resistance of frames.
 - .6 locking hardware
 - .7 vandal resistance
- .4 Closeout submittals:
 - .1 Submit closeout submittals in accordance with Section 01 78 00.
 - .2 Provide 2 copies of data for maintenance and routine cleaning.
 - .3 Provide 2 copies of final record reviewed shop drawings for School Board's records.
 - .4 Contractor shall supply all accessories as may be required for the operation and performance of the windows system.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

- .2 Collect and separate for disposal recyclable packaging materials in appropriate on-site for recycling.
- .3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .4 Divert unused or damaged wood materials from landfill to recycling facility approved by Consultant.
- .5 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .6 Divert unused caulking material from landfill to official hazardous material collections site approved by Consultant.
- .7 Plastic caulking tubes are not recyclable and must not be diverted for recycling with other plastic materials.

1.8 WARRANTY

- .1 Submit a manufacturer's warranty against defects in materials and workmanship covering the components of the window system for a period of ten (10) years. The manufacturer shall supply a non-pro-rated warranty covering labour, materials, tools and equipment to repair and/or replace any materials defects at no additional cost, for a period of ten (10) years including defects or failures due to poor workmanship and installation.
- .2 The supplier shall also submit a warrantee, in accordance with Section 088050-Glazing, for 10 years warranting the sealed units against defects.

Part 2 Products

2.1 SYSTEMS AND MANUFACTURERS

- .1 Drawings and Details are based on 970 Series with 1350 Series Vents as manufactured by Alumicor Ltd. (416) 745-4222.
- .2 Approved exterior window systems meeting or exceeding these specifications by the following manufacturers will be considered:
 - .1 Alumicor
 - .2 Aerloc Industries
 - .3 Alwind Industries
 - .4 Kawneer Company of Canada
 - .5 Windspec Inc.

2.2 MATERIALS

- .1 Extrusions shall conform to ASTM B221 and be AA6063 T54 alloy and temper for framing.

- .2 Formed aluminum sheet and plate components shall be AA1100-H14 alloy and temper suitable for their purpose and finish.
- .3 Exposed anodized sheet and plate shall conform to ASTM B209, to AA5005-H14 alloy and temper or AA1100-H14 alloy and temper (anodizing quality, 1.6 mm thickness).
- .4 Non-exposed sheet and plate to AA3003-H14 alloy and temper, mill finish.
- .5 Fasteners shall be 300 series stainless steel or 400 series stainless steel cadmium plated and of sufficient size and quantity to perform their intended function.
- .6 Weathering and glazing gaskets shall be extruded, black, closed cell or dense elastomer of durometer appropriate to the function.
- .7 Glass and glazing materials: In accordance with Section 08 80 50 – Glazing.
- .8 Glazing tapes shall be preformed polyisobutylene-butyl glazing tape with integral shim strip, 10-15 durometer, hardness, paper release, black color. Acceptable materials: Tremco Polyshim II by Tremco Ltd.
- .9 Exterior Sills: extruded aluminum, minimum 3 mm thick, complete with joint covers, complete with jamb drip deflectors on both sides of each sill (refer also to drawings for type), chairs, anchors, anchoring devices. All corners shall be ground or rounded to eliminate burrs and sharp edges. Submit details with shop drawings. Sills to be one continuous piece along sill of window.
- .10 Sealants: ASTM C920, Type S, Grade NS, Class 100; One-part, Moisture -curing silicone, '790 Silicone Building Sealant' by Dow Corning Corporation or Spectrum 1 by Tremco. Colour: As selected by Consultant.
- .11 Foam Backer Rod: to be extruded, closed cell foam, round polyethylene rope, minimum 25% wider than width of joint cavity to be caulked. To be compatible with primers and sealants.
- .12 Void filler foam: one part expanding polyurethane closed cell foam by BASF, Hilti or approved alternate specifically designed for window applications. To be compatible with primers and sealers
- .13 Bedding Compound: to CGSB 19-GP-14M.
- .14 Isolation Coating: alkali resistant bituminous paint.
- .15 Window hardware: Heavy duty roto operator window hardware to include all components as required for smooth, secure and complete operation and to be reviewed by the Consultant prior to ordering. Provide samples for Consultant's approval.
- .16 All perimeter sections to be tubular/closed back sections for continuous adhesion and continuity of building envelope membrane.
- .17 Window supplier / installer to provide and install continuous angles or clips as required for fastening windows to building structure.

2.3 FABRICATION

- .1 Fabricate aluminum windows in accordance with reviewed shop drawings and manufacturer's written instructions.
- .2 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:
- .3 Fabricate framing from extrusions of size and shape shown on shop drawings. Interior and exterior extruded aluminum framing sections shall be integrated with a glass reinforced nylon thermal break to form a rigid composite assembly without the use of fasteners or other thermal bridging elements.
- .4 Composite frame assembly shall have a minimum of 1100 lbf/4 in. (4815N/ 100 mm) resistance to shear between the aluminum and the thermal break materials.
- .5 Dry shrinkage of the thermal break shall not exceed 0.1% of the framing member length.
- .6 All framing joints shall be accurately machined, assembled, and sealed to provide neat weather tight connections. Coupling mullions shall be designed to provide a functional split to permit modular construction and allow for thermal expansion. Glass stops shall be lock-in screwless type.
- .7 Elastomeric air seal gasket shall be installed around the full perimeter of glass and sealed at corners with silicone sealant. Air seal gasket must provide adhesion with silicone sealant.

2.4 ALUMINUM FINISHES

- .1 Exposed aluminum sections and infill panels or interior column covers, if any, shown on drawings be given an anodic oxide treatment in accordance with Aluminum Association specification AA-M12C22A34 black anodized Class II, 10µm (.0004 inch.) in accordance with AAMA 611.
- .2 For exterior spandrel panels –if required on the project, to be a black anodized infill panel to match windows finish complete with solid support substrate and insulation layer, black anodized aluminum smooth or textured finish to Consultant selection.
- .3 If Colour finish other than anodized is indicated on drawings or required to match existing, enamel finish shall be PPG Duranar finish (minimum 8000 series) or approved alternate.
- .4 Final approval of finish and colour to be made by Consultant.

2.5 HARDWARE

- .1 Provide heavy duty roto operator hardware in conjunction with friction arms, aluminum hinges, and concealed allen key with removable type knob handle and all required additional components. Provide samples for Consultant's approval.
- .2 Limiting stops: All operable windows within reach of occupants to have limiting stops to each hinge to restrict the opening to a maximum of 225mm.

- .3 Operating pole: Provide one varnish finished hardwood pole with blunt end hook suitable for spring catch latch, for each room in which operating hardware is more than 1800 mm from floor.

- .4 Verify all site conditions regarding location and exact assembly requirements.

2.6 INSECT SCREENS

- .1 Provide insect screens at all operable windows.

2.7 ISOLATION COATING

- .1 Isolate aluminum from following components, by means of isolation coating:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze or small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

2.8 GLAZING

- .1 Prepare windows to receive 25 mm thick double glazed insulating glass specified under Section 088050 – Glazing. Glaze windows in accordance with CSA-A440/A440.1.

2.9 THRU-WALL FLASHING

- .1 Sub-sill flashings to be Blueskin SA by Bakor in locations shown on drawings. Adhere to substrate using primer approved by manufacturer. Ensure clean-up of excess primer and no visible edges of flashing upon completion of the work.

2.10 EXTRUDED SILLS

- .1 Sills are to be a minimum of 7 degree (7°) downward slope and integral drip which extends a minimum of 25 mm from the face of the wall cladding.
- .2 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Break form shapes are not permitted.

2.11 ALUMINUM PANNING

- .1 Panning to be extruded aluminum minimum 1.6 mm thick with pre-coated finish to be identical process and match to aluminum frames and sills. Break form shapes are not permitted.
- .2 Submit samples of panning along with samples of other extrusions and materials.
- .3 Metal panning to be designed to lock into new window frames and have true flat planes with no twists, buckles dents, “oil canning” or other similar visual defects caused by manufacturing or handling.

Part 3 Execution

3.1 PREPARATION

- .1 Protect adjacent surfaces from damage resulting from work under this specification.

3.2 WINDOW INSTALLATION

- .1 Install in accordance with CSA-A440/A440.1, reviewed shop drawings and manufacturer's written instructions.
- .2 Coordinate with Section 08 80 50 as required for installation of glass and glazing materials.
- .3 Arrange components to prevent abrupt variation in colour.
- .4 Install the windows in accordance with the manufacturer's instructions. Install the windows plumb, level and true relative to building structure. Do not exceed 3mm in 3050 mm (1/8" in 10'0") variation from plumb and level. Foam insulate between the frame members and the window opening using a single component polyurethane foam, insulating sealant.

3.3 SILL INSTALLATION

- .1 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Ensure integral end caps are secured with no burrs or exposed sharp edges and do not require excessive caulking due to profiles at jamb. Break form shapes are not permitted.

3.4 CAULKING

- .1 Seal joints between frame members and other non-operating components with sealant to provide weathertight seal at outside.
- .2 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip reflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.
- .3 Apply sealant in accordance with manufacturer's written instructions and additional requirements as outlined in Section 07 92 10 - Joint Sealing. Conceal sealant within window units except where exposed use is permitted by Consultant.
- .4 Interior trims and sealant not to be applied until installed window has been inspected and approved by the Consultant.

3.5 ADJUSTING

- .1 Adjust operable units to move smoothly, with proper tension, throughout their full range of motion and to fit tightly when closed and locked.
- .2 Lubricate hardware in accordance with manufacturer's instructions.

- .3 Ensure that weatherstripping makes weathertight contact and does not cause binding to affect closing and locking.

3.6 CLEAN UP

- .1 Clean glass at the factory. For final cleaning of glass to remove job site soiling refer to Section 088050 - Glazing. Leave all surfaces clean, free from sealants, caulking or other foreign material. Remove all surplus materials and debris resulting from the work of this Trade.
- .2 Refer to other sections for requirements to make good all finishes.

3.7 PROTECTION

- .1 Aluminum shall be isolated from concrete, mortar, plaster or dissimilar metals with bituminous paint or epoxy solution. Framing shall be protected from other building materials during and after installation until acceptance.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 1
- .2 Section 06 40 00 – Architectural Woodwork.
- .3 Section 08 11 14 – Metal Steel Doors and Frames.
- .4 Section 26: Electrical wiring for magnetic strikes, electric releases and electric locks.

1.2 SECTION INCLUDES

- .1 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.
- .2 Hardware Supply: It is the intention of this Section that Installation is by a specialist hardware supplier as prequalified herein for the following scope:
 - .1 Supply only of door hardware for all exterior and interior doors.
 - .2 Supply of locksets for millwork units.
 - .3 Supervision of door hardware installation (Hardware Consultant).
 - .4 Supply and installation of automatic operators.
- .3 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.
 - .1 Scope: Installation of door hardware for all interior and exterior doors, locksets to teachers closets and coordination of installation of automatic operators with Division 26.
- .4 Hardware Inspection: It is the intention of this section that Installation is by the General Contractor for all systems and methods described herein.
 - .1 Scope: inspection of installation of door hardware.

1.3 REFERENCES

- .1 CAN/CGSB-69.17-M86 – Bored and Pre-assembled Locks and Latches
- .2 CAN/CGSB-69.18-M90/ANSI/BHMA-A156.1-1981 – Butts & Hinges
- .3 CAN/CGSB-69.19-M93/ANSI/BHMA-A156-3-1989 – Exit Devices
- .4 CAN/CGSB-69.20-M90/ANSI/BHMA-A156-4-1986 – Door Controls (Closers)
- .5 CAN/CGSB-69.29-93/ANSI/BHMA-A156-13-1930 – Mortise Locks & Latches

- .6 CAN/CGSB-69.34-93/ANSI/BHMA-A156.18-1987 – Materials & Finishes
- .7 Canadian Steel Door & Frame Manufacturers Association (CSDFMA),
- .8 Canadian Metric Guide for Steel Doors & Frames (Modular Construction)
- .9 NFPA 80-1995 – Fire Doors and Fire Windows

1.4 REQUIREMENTS FOR REGULATORY AGENCIES

- .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 SUBMITTALS

- .1 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Butt hinges
 - .2 Continuous hinges
 - .3 Door closers
 - .4 Exit devices
 - .5 Overhead stops
 - .6 Storeroom set with lever trim
 - .2 Identify each sample by a label indicating location for installation, applicable specification paragraph number, brand name and number, finish, and hardware package number.
 - .3 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.
 - .4 Substitute new samples for those rejected by the Consultant.
 - .5 Do not supply door hardware to the site until all samples are approved by the Consultant.
- .2 Hardware List:
 - .1 Submit contract hardware list in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit six copies of a detailed final door hardware list prepared by a qualified Architectural Hardware Consultant.
 - .3 List all items to be furnished and delivered under this section.
 - .4 Indicate door hardware proposed, identifying each item by manufacturer name, manufacturer's catalogue model number, material, function, finish, location, and other pertinent information.
 - .5 The list shall be in the same format as the door hardware list bound in this project manual.
 - .6 Approval of the Final Door Hardware List by the Consultant and the Owner shall not relieve the Contractor from responsibility for providing all required door hardware.

- .3 Template:
 - .1 Within ten working days of being requested by the Consultant or the Contractor, submit templates for door and frame preparations and mounting of door hardware items.
 - .2 Identify each template by label indicating applicable specification paragraph number, brand name and number, door number, and hardware package number.
 - .3 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.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .2 Storage and Protection:
 - .1 Store finishing hardware in locked, clean and dry area.

1.7 WASTE DISPOSAL AND MANAGEMENT

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Dispose of packaging material in appropriate on-site bin for recycling.

1.8 MAINTENANCE DATA

- .1 Provide parts list, manufacturers' instructions, and operation and maintenance data for each type of door hardware for incorporation into maintenance manual specified in Section 017800 – Closeout Submittals.
- .2 Brief the Owner's maintenance staff regarding proper care, cleaning, and general maintenance of door hardware.

1.9 MAINTENANCE MATERIALS

- .1 Supply four sets of wrenches for door closers, locksets, latchsets, and exit devices.
- .2 Supply four sets of other special parts or tools required for proper maintenance and adjustment of door hardware (excluding tools required for keying.)

1.10 WARRANTY

- .1 Submit a warranty for door hardware on a form approved by the Owner and in accordance with the General Conditions, but for a period of three (3) years unless specified otherwise. Where a manufacturer's standard warranty period exceeds three years it shall prevail.
- .2 The warranty for both fire exit devices and power door operators shall be for a period of five (5) years.

- .3 The warranty for door closers shall be for a period of ten (10) years.
- .4 Provide a lifetime warranty for all mortise hinges.
- .5 Door hardware warranties shall cover all defects in material and workmanship that become apparent during the warranty period and such defects shall be made good or the defective product shall be replaced, to the satisfaction of the Owner and at no cost to the Owner.

Part 2 Products

2.1 HARDWARE ITEMS

- .1 Use one manufacturer's products only for similar items.

2.2 DOOR HARDWARE

- .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 The base bid shall be based on the manufacturers and products specified and listed in the attached Door Hardware List and Article 2.02 below.
- .3 Use one manufacturer's products only for all similar items.
- .4 Ensure that the hardware specified is suitable in both dimension and function for the intended purpose and complies with building code requirements. Advise the Consultant of discrepancies or omissions.
- .5 Approved Hardware Suppliers – Door hardware shall be supplied by an approved dealer and is not limited to the list below:
 - .1 Commercial Doors & Hardware, Toronto 416 749-7231
 - .2 Upper Canada Hardware, East York, 416 696-8358
 - .3 Great Lakes Architectural Hardware, Hamilton 905 383-3334
 - .4 Regional Doors & Hardware, St. Catharines, 905 684-8161
 - .5 Allegion Canada Inc., Mississauga, [647 376-6610](tel:6473766610)
- .6 KEY CONTROL CABINET:
 - .1 Enamel finish steel cabinet
 - .2 Three-way cross reference index card system
 - .3 Provide all accessories to accommodate all keys
 - .4 Size cabinet to allow for 25% expansion
- .7 KEYING:
 - .1 All locks shall be 7-Pin removable core by Best Locks.

- .2 As part of the cost of this Section, the door hardware Subcontractor shall obtain brass construction cores for all locks from Best Locks.
- .3 As part of the cost of this Section, all locks and cylinders are to include Best permanent cores great-grand master keyed to the Owner's requirements.
- .8 STRIKES: ANSI with lip, except deadlock strikes which shall be ANSI without lip.

2.3 ACCEPTABLE MANUFACTURERS AND PRODUCTS

- .1 The following tables list acceptable door hardware manufacturers and products.
- .2 The tables may list acceptable equivalent products.
 - .1 Equivalent products are considered equal and may be substituted for the products listed in the attached Door Hardware List without further approval from the Owner.
 - .2 Where equivalent products are not listed, provide the named base bid products only.
 - .3 No other door hardware items other than those listed below will be accepted unless formal approval of an alternative is granted in writing by the Owner prior to the close of the Bid period.
 - .4 FINISH: Take special care to co-ordinate all of the various manufactured items furnished under this Section to ensure an acceptably uniform finish.
 - .5 HARDWARE FINISH CODES AND DESCRIPTIONS: Note: Not all of the codes listed in this table are necessarily used in the Work. Refer to the attached Door Hardware List for final finishes.

BHMA CODE	CANADIAN CODE	U.S. CODE	DESCRIPTION
600	CP	USP	Primed for paint (steel)
619	C15	US15	Satin nickel plated (brass bronze)
626	C26D	US28	Satin chromium plated (brass bronze)
628	C28	US32D	Satin aluminum, clear anodized
630	C23D, AL	-	Satin stainless steel
689	SB, AL	-	Aluminum plated
B	-	-	Brush
NEO	-	-	Neoprene
P	-	-	Pile
V	-	-	Vinyl

.3 MANUFACTURERS NAMES ABBREVIATIONS:

ABBREVIATION	MANUFACTURER NAME
BEST	Best Locks
CBH	Canadian Builders Hardware Mfg.Inc.
CORBIN	Corbin-Russwin Architectural Hardware (Yale-Corbin Canada)
DB	Dominion Brass
DORMA	Dorma Door Controls
GSH	Gallery Specialty Hardware
GJ	Glynn-Johnson (Ingersoll-Rand Architectural Hardware)
HAGER	Hager Hinge (Canada) Ltd.
KNC	K.N. Crowder Mfg. Inc.
LCN	LCN Closers (Ingersoll-Rand Architectural Hardware)
MARKAR	Markar Products Inc.
NORTON	Yale/Rixson Firemark Canada Ltd.
PEMKO	Pemko Mfg. Co.
RIXSON	Yale/Rixson Firemark Canada Ltd.
SARGENT	Sargent of Canada Ltd.
SCHLAGE	Schlage Lock Company (Ingersoll-Rand Architectural Hardware)
STANLEY	Stanley Hardware Canada
THOMAS	K.M. Thomas
VON-DUPRIN	Von-Duprin Inc. (Ingersoll-Rand Architectural Hardware)
YALE	Yale/Rixson Firemark Canada Ltd.
ZERO	Zero International Inc.

.4 HARDWARE LIST ABBREVIATIONS

ABBREVIATIONS	TERM
B/S	Back Set
CIF	Channel Iron frame
CTB	Counter-sunk Through Bolts
D/A	Double Acting
D/E	Double Egress
HMD	Hollow Metal Door
HMF	Hollow Metal Frame
H/O	Hold Open
LH	Left Hand
LHR	Left Hand Reverse
LS	Lead Shields
MFR	Minutes of Fire-Rating
MS	Machine Screws
NRP	Non Removable Pin

O/H	Over Head
O/S	Opposite Swing
PR.DRS	Pair of Doors
PSF	Pressed Steel frames
RH	Right Hand
RHR	Right Hand Reverse
SGL.DR.	Single Door
STS	Self-tapping Screws
TB	Through Bolts
TMS	Template Machine Screws
U/C	Undercut
WD	Wood Door
WDF	Wood Frame
WS	Wood Screws

.5 BUTT HINGES – FULL MORTISE:

ACCEPTABLE MANUFACTURERS	ITEM	ITEM	ITEM
HAGER	BB1168	BB1199	BB1279
STANLEY	FB 168	FBB199	FBB179

- .1 Interior: 626 finish
- .2 Exterior: 630 finish
- .3 Non-removable pins at out-swinging exterior doors and all vestibule doors.
- .4 Where doors are required to swing 180 degrees, furnish hinges of sufficient throw to clear trim.
- .5 All full mortise hinges shall be ball bearing, standard duty or heavy duty as required.

.6 CONTINUOUS HINGES:

ACCEPTABLE MAUFACTURER	ITEM	ITEM
MARKAR	FM300	FM200
GSH	CH-951	CH0941

- .1 Interior: 600 finish

.2 Exterior: 630 finish

.7 LOCKSETS: 630 FINISH

ACCEPTABLE MANUFACTURERS	ITEM	ITEM	ITEM	KNOB STYLE
BEST	35H7J	35H7EW	L-15-H	4A
SARGENT	8237	8204	LNL	LB
SCHLAGE	L9070	L9080	06B	42B

- .1 Where lever handles are listed, they shall be solid, not hollow.
- .2 All lever handles listed must be 630 finish. 626 finish will not be accepted.

.8 LATCHSETS: 630 FINISH

ACCEPTABLE MANUFACTURERS	ITEM	ITEM	ITEM
BEST	35H-N	35H-LF	L-15-H
SARGENT	8215	8265	LNL
SCHLAGE	L9010	L9040	06B

- .1 Where lever handles are listed, they shall be solid, not hollow.
- .2 All lever handles listed must be 630 finish. 626 finish will not be accepted.

.9 CYLINDERS AND 7-PIN REMOVABLE CORES & TEACHER'S CLOSET LOCKS: 626 FINISH

ACCEPTABLE MANUFACTURERS		ITEM	ITEM
BASE BID	BEST	1E74	1E72
NO EQUIVALENTS	NO ALTERNATES	---	---
	BEST	63K 7R 4C S3 X 626	---

- .1 Removable and interchangeable 7-pin core design.

.10 DOOR PULLS: 630 FINISH

ACCEPTABLE MANUFACTURERS	ITEM
CBH	7009-1
GSH	1181-2
HAGAR	HA 12L

- .1 All exterior doors requiring door pulls shall be supplied with 32 mm diameter solid stainless steel door pulls.
- .2 All interior doors requiring door pulls shall be supplied with 25 mm diameter solid stainless steel door pulls.
- .3 Offset door pulls shall be supplied on exterior doors equipped with night latch function exit devices to accommodate rim cylinders. Ensure that interior push pull doors are equipped with identical offset pulls to match.

.11 EXIT DEVICES- RIM TYPE: 626/630 FINISH

ACCEPTABLE MANUFACTURES	ITEM	ITEM
SARGENT	8810-F OR G	8804-F OR G
VON-DUPRIN	98EO	98NL-OP
YALE	7100-width	7100-width-521

- .1 Use hex key and cylinder dogging at power operated doors only.
- .2 Use hex bolts or through-bolts complete with sleeves for exit devices on mineral core doors.
- .3 All exit device trim must be free-wheeling design.

.12 DOOR CLOSURE: 689 FINISH

ACCEPTABLE MANUFACTURERS	ITEM	ITEM
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DORMA	4600	6600
LCN	1460	4110
NORTON	8501BF	7500
SARGENT	1430	350

- .1 Where required, out swinging doors and interior doors shall have closures with parallel arms.
- .2 Back checking feature shall be of a proper size to operate the door efficiently.
- .3 All closures shall be complete with full cover of same design and manufacturer.
- .4 All interior closers shall be reduced-force type.
- .5 All interior doors for barrier-free use shall be delayed action and reduced-force type, meeting OBC requirements.
- .6 Mount closures on interior room side of doors.
- .7 All door closures shall be mounted with through-bolts.

.13 KICKPLATES: 630 FINISH

ACCEPTABLE MANUFACTURERS	SIZE (MM)	SIZE (MM)
CBH	200 X Length Listed	400 x Length Listed
DB	200 X Length Listed	400 x Length Listed
GSH	200 X Length Listed	400 x Length Listed

- .1 Confirm kick plate sizes prior to ordering.
- .2 Minimum thickness: 1.3 mm.
- .3 Stainless steel: Type 304, No. 4 Finish-free from rough or sharp edges.
- .4 Corners and edges shall be slightly rounded.
- .5 Drill plates for countersunk fixing with stainless steel flathead screws flush with finished surface.

.14 PUSH PLATES: 630 FINISH

ACCEPTABLE MANUFACTURERS	ITEM
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CBH	127 X Length Listed
DB	127 X Length Listed
GSH	127 X Length Listed

- .1 Confirm kick plate sizes prior to ordering.
- .2 Minimum thickness: 1.3 mm.
- .3 Stainless steel: Type 304, No. 4 Finish-free from rough or sharp edges.
- .4 Corners and edges shall be slightly rounded.
- .5 Drill plates for countersunk fixing with stainless steel flathead screws flush with finished surface.

.15 OVERHEAD STOPS/HOLDERS: 626 FINISH

ACCEPTABLE MANUFACTURERS	ITEM	ITEM
GJ	104S	454S
RIXSON	1-336/436	10-336/446
SARGENT	693	1543

- .1 Use appropriate overhead door stop & holder where wall stops cannot be used.
- .2 Do not use floor stops.

.16 WALL STOPS: 626 FINISH

ACCEPTABLE MANUFACTURERS	ITEM
GSH	GSH 240
CBH	CBH 145

- .1 Do not use floor stops.
- .2 Do not use wall stops on non-masonry walls.

.17 WEATHERSTRIPPING: 628P FINISH

ACCEPTABLE MANUFACTURERS	ITEM	ITEM
KNC	W16P	W20P
PEMKO	309AP x Height	2891AP x Width
ZERO	98A x Height	---

- .1 Install head weather-stripping uncut in one continuous length prior to installation of door closures or other hardware to the head of the door frame.
- .2 Install jamb weather-stripping uncut in one continuous length, except that it may be cut at the strike location of surface mounted fire exit hardware.

.18 DOOR SWEEPS: 628NEO FINISH

ACCEPTABLE MANUFACTURERS	ITEM
KNC	W13S x Length
PEMKO	315CN x Length
ZERO	39A x Length

.19 THRESHOLDS: 628 FINISH

ACCEPTABLE MANUFACTURERS	ITEM	ITEM
HAGER	412SA	---
KNC	CT10	CT32
PEMKO	171A	---

- .1 Confirm threshold sizes prior to ordering.

.20 POWER DOOR OPERATORS:

ACCEPTABLE MANUFACTURERS		ITEM	ITEM
BASE BID	HORTON	4100	4100
ALTERNATE	ASA ABLOY	SW200 Low energy swing door operator	SW200 Low energy swing door operator

.21 HOLD OPEN DEVICES:

ACCEPTABLE MANUFACTURERS		ITEM	ITEM
BASE BID	YALE-CORBIN	FM998 x Tri-volt	FM998 x Tri-volt
NO EQUILALANTS &	NO ALTERNATES	---	---

2.4 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.

Part 3 Execution

3.1 MANUFACTURER'S 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.
- .2 Door hardware shall be installed by an approved Hardware Installer selected by the Hardware Supplier.
- .3 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.
- .4 Power door operators and **emergency assist devices** 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 26 (Electrical Contractor.). **The low voltage wiring to be supplied by the Hardware Supplier to the Electrical Contractor for installation.**
- .5 ARCHITECTURAL HARDWARE CONSULTANT:
 - .1 The hardware supplier shall have in its 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 Owner.
 - .2 The Architectural Hardware Consultant must supervise hardware installation, provide assistance to the Hardware Installer, and carry out inspection and provide written certification of the finished door hardware installation.
 - .3 Allow for a minimum of three inspections during the course of hardware installation and one final inspection.
 - .4 Ten percent (10%) of this subtrade's contact will be considered as fair value for supervision and inspection with regard to progress certificates.
 - .5 Locate and mount hardware at standard location dimensions in accordance with CSDFMA, Canadian Metric Guide for Steel Doors and Frames (Modular Construction), and as indicated in the following table:

HARDWARE MOUNTING HEIGHTS	
HARDWARE ITEM	DIMENSION ABOVE FINISHED FLOOR
LOCKSET or LATCHSET	950 mm to Centreline of Strike
DEADLOCK	1200 mm to Centreline of Strike
EXIT DEVICE	950 mm to Centreline of Strike
PUSH PLATE/DOOR PULLS	900 mm to Centreline of Strike

.6 HARDWARE MOUNTING HEIGHTS

- .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 064000 – 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

3.3 ADJUSTING

- .1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.
- .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 In addition to this available consultant, a Hardware Inspector shall be engaged upon recommendation to the Board by the Consultants and costs for inspection paid for from Cash Allowances.
 - .3 The Consultant shall advise the Contractor that Hardware Inspector shall be assigned to supervise the hardware installation, provide assistance to the Hardware Installer, and carry out inspection and provide written certification of the finished door hardware installation. Costs for this inspection shall be paid from the Cash Allowance. The Contractor shall notify the Hardware Inspector at least 72 hours prior to commencing the installation and cooperate with the advice of the inspector.
 - .4 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.
 - .5 If requested by the Consultant, the manufacturer's technical representative for each make of the hardware used in the Work shall be in attendance during the hardware inspection.
 - .6 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.
- .4 Upon completion of door hardware installation, the Hardware Supplier shall submit a written certificate that all hardware has been correctly supplied and 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.

- .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.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacture's instructions.
- .3 Remove protective material from hardware items where present.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 - GENERAL

1.1 This hardware schedule has been prepared by:

Commercial Doors & Hardware.

**Division of L.H. Ruprecht Limited
43 Millwick Drive
Weston, Ontario
M9L 1Y4
Phone: (416) 749-7231 Fax: (416) 749-0683**

**CONSULTANT
Ross Ruprecht, B.A., A.H.C.**

PART 2 - FINISHING HARDWARE SCHEDULE

Refer to the Finishing Hardware List on the following pages.

Finishing Hardware Schedule

Mount Hope ES Reno 2025 HWDSB R1

Architect
Hossack Architecture.

Detailer: **Austin Baril**
Consultant: **Ross Ruprecht B.A., A.H.C.**

Submittal Date: **Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25**



Commercial Doors & Hardware Ltd.
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Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Manufacturers & Finishes

Manufacturers

Camden
Canaropa
CBH
DS
Gallery
Glynn-Johnson
GYROTECH
Ives
K.N. Crowder
LCN
Schlage
Security
Von Duprin
WS
Zero

Finishes

626 - Satin chromium plated
over nickel
628 - Satin aluminum, clear
anodized
630 - Satin stainless steel
652 - Satin chromium plated
over nickel
689 - Aluminum painted
US15 - Satin nickel plated, clear
coated
US26D - Satin chromium plated
over nickel
US28 - Satin aluminum, clear
anodized
US3 - Bright brass, clear coated
US32D - Satin stainless steel



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Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Openings Schedule

Opening Number(s)	Qty	Door Mat'l	Frame Mat'l	Location 1	To/ From	Location 2	Nominal Width	Nominal Height	Door Thickness	Hand	Label	Degree of Opening	Hardware Group	Remarks	Heading Num.
X126B-A	1	HM	HM	CORRIDOR X118	From	COAT ROOM X126B			44	RHR		90°	CLASS RM OH	MATCH EXISTING SIZES	1
X126B-B	1	EXIST	EXIST	COAT ROOM X126B	To	KINDERGARTEN X126			44	RH		90°	EXISTING	NEW PAINT	2
X126B-C	1	EXIST	EXIST	COAT ROOM X126B	To	KINDERGARTEN X128			44	LH		90°	EXISTING	NEW PAINT	2
X126B-D	1	EXIST	EXIST	EXTERIOR	From	COAT ROOM X126B			44	LHR		90°	EXISTING	NEW PAINT	2
X131-A	1	HM	HM	CORRIDOR X118	From	KINDERGARTEN X131			44	RHR		90°	CLASS RM SEC OHS CH	MATCH EXISTING SIZES	3
X132-A	1	EXIST	EXIST	RESOURCE RM 132	To	CUSTODIAL X123A			44	RH		90°	EXISTING	NEW PAINT	2
X140-A	1	EXIST	EXIST	CORRIDOR X142	To	SUPPLIES & RECEIVING X140			44	LH		90°	EXISTING	NEW PAINT	2
X140A-A	1	EXIST	EXIST	SUPPLIES & RECEIVING X140	From	CUSTODIAL OFFICE X140A			44	RHR		90°	EXISTING	NEW PAINT	2
X140B-A	1	EXIST	EXIST	SUPPLIES & RECEIVING X140	To	ELECTRICAL X140B			44	LH		90°	EXISTING	NEW PAINT	2
X140B	1	EXIST	EXIST	SUPPLIES & RECEIVING X140	To	ELECTRICAL X140B			44	RHR		90°	EXISTING	NEW PAINT	2
A140C-A	1	HM	HM	SUPPLIES & RECEIVING X140	To	ELECTRICAL A140C-A	950	2150	44	LH	ULC	90°	STORAGE CUSH		4
141-A	1	HM	HM	KINDERGARTEN X131	To	WASHROOM 141	950	2150	44	LH		90°	WR KINDER CH		5
X141-A	1	EXIST	EXIST	CORRIDOR X142	To	CLASSROOM X141			44	RH		90°	EXISTING	NEW PAINT	2
X143-A	1	EXIST	EXIST	CORRIDOR X143	From	CORRIDOR X142			44	RHR		90°	EXISTING	NEW PAINT	2
X144-A	1	HM	HM	EXTERIOR	From	SPRINKLER X144	1000	2150	44	RHR		90°	EXTERIOR, SGL, STORAGE		6
100-A	1	ALUM	ALUM	EXTERIOR	From	VESTIBULE 100	1000, 1000	2150	44	LHRA/RHRA		90°	ENTRANCE F0001A-DBL D	ADO, ES, CR VIDEO INTERCOM	7
100-B	1	HM	HM	VESTIBULE 100	From	CORRIDOR 114	1000, 1000	2150	44	LHRA/RHRA		90°	Entrance Foyer 100.1b	ADO	8
102-A	1	HM	HM	CORRIDOR 114	To	OFFICE 102	950	2150	44	LH		90°	CLASS RM SEC CL		9
103-A	1	HM	HM	CORRIDOR 114	To	STAFF RM 103	950	2150	44	LH		90°	CLASS RM SEC CL		9
104-A	1	HM	HM	CORRIDOR 114	To	KITCHEN 104	950	2150	44	LH	1HR	90°	CLASS RM SEC CL		10
104A-A	1	HM	HM	KITCHEN 104	To	WALK-IN PANTRY 104A	950	2150	44	RH		90°	STORAGE NO CL OHS		11
105-A	1	HM	HM	CORRIDOR 114	To	BF WASHROOM 105	950	2150	44	LH		90°	WR OP 950	ADO	12
106-A	1	HM	HM	CORRIDOR 114	To	LAUNDRY 106	950	2150	44	RH		90°	CLASS RM , WS, SC		13
107-A	1	HM	HM	CORRIDOR 114	To	CUSTODIAL & MECHANICAL 107	1100	2150	44	LH	1HR	90°	MECH RM , 1200		14
108-A	1	HM	HM	CORRIDOR 114	To	STROLLER STORAGE 108	950	2150	44	LH		90°	STORAGE CL DEL ACT		15
109-A	1	HM	HM	CORRIDOR 114	To	INFANT 109	950	2150	44	RH		90°	CLASS RM SEC FG CH		16
109-B	1	ALUM	ALUM	EXTERIOR	From	INFANT 109	950	2150	50	LHR		90°	N132CC		17
109A-A	1	HM	HM	INFANT 109	To	STORAGE 109A	950	2150	44	RH		90°	STORAGE WS, FG		18
109B-A	1	HM	HM	INFANT 109	To	WASHROOM 109B	950	1200	44	LH		90°	HALF DR	HALF DOOR	19
109C-A	1	HM	HM	INFANT 109	To	SLEEPING 109C	950	2150	44	RH		90°	CLASS RM SEC FG OH		20
110-A	1	HM	HM	CORRIDOR 114	To	TODDLER 110	950	2150	44	RH		90°	CLASS RM SEC FG CH		16
110A-A	1	HM	HM	TODDLER 110	To	WASHROOM 110A	950	2150	44	LH		90°	WR WS, FG		21
111A	1	HM	HM	CORRIDOR 114	To	TODDLER 111	950	2150	44	LH		90°	CLASS RM SEC FG CH		16
111A-A	1	HM	HM	TODDLER 111	To	WASHROOM 111A	950	2150	44	RH		90°	WR WS, FG		21
111B-A	1	HM	HM	TODDLER 110	To	STORAGE 111B	950	2150	44	LH		90°	STORAGE WS, FG		18
111B-B	1	HM	HM	TODDLER 111	To	STORAGE 111B	950	2150	44	RH		90°	STORAGE WS, FG		18
111C-A	1	HM	HM	VESTIBULE 111C	From	TODDLER 110	950	2150	44	LHR		90°	VEST ,SGL PP, FG		22
111C-B	1	HM	HM	VESTIBULE 111C	From	TODDLER 111	950	2150	44	RHR		90°	VEST ,SGL PP, FG		22
111C-C	1	ALUM	ALUM	EXTERIOR	From	VESTIBULE 111C	950	2150	50	LHR		90°	N132CC		17
112A	1	HM	HM	CORRIDOR 114	To	PRE-SCHOOL 112	950	2150	44	RH		90°	CLASS RM SEC FG CH		16
112A-A	1	HM	HM	PRE-SCHOOL 112	To	WASHROOM 112A	950	2150	44	RH		90°	WR WS, FG		21
113A	1	HM	HM	CORRIDOR 114	To	PRE-SCHOOL 113	950	2150	44	LH		90°	CLASS RM SEC FG CH		16



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Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Opening Number(s)	Qty	Door Mat1	Frame Mat1	Location 1	To/ From	Location 2	Nominal Width	Nominal Height	Door Thickness	Hand	Label	Degree of Opening	Hardware Group	Remarks	Heading Num.
113A-A	1	HM	HM	PRE-SCHOOL 113	To	WASHROOM 113A	950	2150	44	RH		90°	WR WS, FG		21
113B-A	1	HM	HM	VESTIBULE 113B	From	PRE-SCHOOL 112	950	2150	44	LHR		90°	VEST, SGL PP, FG		22
113B-B	1	HM	HM	VESTIBULE 113B	From	PRE-SCHOOL 112	950	2150	44	RHR		90°	VEST, SGL PP, FG		22
113B-C	1	ALUM	ALUM	EXTERIOR	From	VESTIBULE 113B	950	2150	50	RHR		90°	N132CC		17
114A	1	HM	HM	CORRIDOR 114	From	CORRIDOR X142	1000, 1000	2150	44	LHRA/RHRA		90°	VEST PR EXITS RM	REM MULLION	23
F1A	1	HM	HM	STAIRS F1	From	CORRIDOR 114	1000, 1000	2150	44	LHRA/RHRA	1HR	90°	VEST PR, OP, ULC	ADO, REM MULLION	24
F1B	1	ALUM	ALUM	EXTERIOR	From	STAIRS F1	1000, 1000	2150	50	LHRA/RHRA		90°	Entrance	ADO, REM MULLION	25
F1C	1	ALUM	ALUM	EXTERIOR	From	STAIRS F1	1000, 1000	2150	50	LHRA/RHRA		90°	ENTRANCE FM	ADO	26
X210-A	1	EXIST	EXIST	CLASSROOM X210	To	STORAGE X210A			44	RH		90°	EXISTING	NEW PAINT	2
X210-B	1	EXIST	EXIST	CORRIDOR	To	CLASSROOM X210			44	RH		90°	EXISTING	NEW PAINT	2
X210-C	1	EXIST	EXIST	CORRIDOR	To	CLASSROOM X210			44	LH		90°	EXISTING	NEW PAINT	2
X211-A	1	EXIST	EXIST	CORRIDOR	To	CUSTODIAL X211			44	LH		90°	EXISTING	NEW PAINT	2
X212-A	1	EXIST	EXIST	STAIR X213	From	CORRIDOR X212			44	RHR/LHR		90°	EXISTING	NEW PAINT	2
200-A	1	HM	HM	CORRIDOR 212	From	LEARNING COMMONS 200	950	2150	44	RHR		90°	STAIR SGL		27
200-B	1	HM	HM	CORRIDOR 212	From	LEARNING COMMONS 200	950	2150	44	LHR		90°	STAIR SGL		27
201-A	1	HM	HM	CORRIDOR 214	To	ELECTRICAL 201	950	2150	44	RH	1HR	90°	STORAGE, WS		28
202-A	1	HM	HM	CORRIDOR 214	To	SEMINAR 202	950	2150	44	LH		90°	CLASS RM, SEC, WS		29
203-A	1	HM	HM	CORRIDOR 214	To	STAFF RESOURCE 203	950	2150	44	LH	1HR	90°	CLASS RM SEC CL		10
203A-A	1	HM	HM	STAFF RESOURCE 203	From	STORAGE 203A	950	2150	44	LHR		90°	STORAGE NO CLOHS		11
205-A	1	HM	HM	CORRIDOR 214	To	RESOURCE 205A	950	2150	44	LH		90°	CLASS RM SEC OHS		30
206-A	1	HM	HM	CORRIDOR 214	To	CLASSROOM 206	950	2150	44	LH		90°	CLASS RM, SEC, WS		29
207-A	1	HM	HM	CORRIDOR 214	To	CLASSROOM 207	950	2150	44	RH		90°	CLASS RM, SEC, WS		29
208-A	1	HM	HM	CORRIDOR 214	To	CLASSROOM 208	950	2150	44	LH		90°	CLASS RM, SEC, WS		29
209-A	1	HM	HM	CORRIDOR 214	To	CLASSROOM 209	950	2150	44	RH		90°	CLASS RM, SEC, WS		29
210-A	1	HM	HM	CORRIDOR 214	To	CLASSROOM 210	950	2150	44	LH		90°	CLASS RM, SEC, WS		29
211-A	1	HM	HM	CORRIDOR 212	To	CLASSROOM 211	950	2150	44	LH		90°	CLASS RM SEC OHS		30
212-A	1	HM	HM	CORRIDOR X201	From	CORRIDOR 212	1000, 1000	2150	44	LHRA/RHRA		90°	VEST PR, PP, FG		31
213-A	1	HM	HM	CORRIDOR 214	To	BF WASHROOM 213A	950	2150	44	LH		90°	WR OP 950	ADO	12
F2A	1	HM	HM	STAIR F2	From	CORRIDOR 214	1000, 1000	2150	44	LHRA/RHRA	1HR	90°, 180°	VEST PR, ULC, RM	REM MULLION	32
TCLOCKS	1	WD	WD										Teachers Closet		33
MISC	1												Misc		34



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2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

GENERAL.

**-HARDWARE SUPPLIER SECTION 08710 IS TO SUPPLY AND INSTALL ALL AUTO
OPERTORS AS SPECIFIED.
NO ALTERNATES WILL BE ACCEPTED.**

**ALL LOCKS AND CYLINDERS TO BE GRAND MASTER KEYED AND A KEY SCHEDULE
PREPAIED FOR OWNERS APPROVAL.**



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2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Hardware Schedule

Heading #1 (Group: CLASS RM OH)

Item #1	1 Elevation X126B-A, CORRIDOR X118 From COAT ROOM X126B	90° RHR
	___ x ___ x 44 - HM DR x HM FR	
3	Standard Hinge	Ives 5BB1 4 1/2" x 4" 652
1	Lockset	Schlage ND70 R RHO 626 GMK NO ALTERNATE
1	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D
1	Overhead Door Stop	Glynn-Johnson 904S US32D

Heading #2 (Group: EXISTING)

Item #2	1 Elevation X126B-B, COAT ROOM X126B To KINDERGARTEN X126	90° RH
Item #3	1 Elevation X126B-C, COAT ROOM X126B To KINDERGARTEN X128	90° LH
Item #4	1 Elevation X126B-D, EXTERIOR From COAT ROOM X126B	90° LHR
Item #5	1 Elevation X132-A, RESOURCE RM 132 To CUSTODIAL X123A	90° RH
Item #6	1 Elevation X140-A, CORRIDOR X142 To SUPPLIES & RECEIVING X140	90° LH
Item #7	1 Elevation X140A-A, SUPPLIES & RECEIVING X140 From CUSTODIAL OFFICE X140A	90° RHR
Item #8	1 Elevation X140B-A, SUPPLIES & RECEIVING X140 To ELECTRICAL X140B	90° LH
Item #9	1 Elevation X140B, SUPPLIES & RECEIVING X140 To ELECTRICAL X140B	90° RHR
Item #10	1 Elevation X141-A, CORRIDOR X142 To CLASSROOM X141	90° RH
Item #11	1 Elevation X143-A, CORRIDOR X143 From CORRIDOR X142	90° RHR
Item #12	1 Elevation X210-A, CLASSROOM X210 To STORAGE X210A	90° RH
Item #13	1 Elevation X210-B, CORRIDOR To CLASSROOM X210	90° RH
Item #14	1 Elevation X210-C, CORRIDOR To CLASSROOM X210	90° LH
Item #15	1 Elevation X211-A, CORRIDOR To CUSTODIAL X211	90° LH
Item #16	1 Elevation X212-A, STAIR X213 From CORRIDOR X212	90° RHR/LHR

___ x ___ x 44 - EXIST DR x EXIST FR

EXISTING DOOR & FRAME. RE USE EXISTING HARDWARE



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Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #3 (Group: CLASS RM SEC OHS CH)

Item #17 1 Elevation X131-A, CORRIDOR X118 From KINDERGARTEN X131 90° RHR

___ x ___ x 44 - HM DR x HM FR

1	Continuous Hinge	Ives 112HD-83" US28	US28
1	Lockset	Schlage ND78 R RHO -IR 47342586 626 GMK NO ALTERNATE	626
1	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
1	Overhead Door Stop	Glynn-Johnson 904S US32D CONFRIM SIZE	US32D

Heading #4 (Group: STORAGE CUSH)

Item #18 1 Single door A140C-A, SUPPLIES & RECEIVING X140 To ELECTRICAL A140C-A 90° LH

950 x 2150 x 44 - HM DR x HM FR - ULC

3	Standard Hinge	Ives 5BB1HW 4 1/2" x 4" 652	652
1	Lockset	Schlage ND80 R RHO 626 GMK NO ALTERNATE	626
1	Surface Closer	LCN 1461 CUSH AL	AL
1	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D

Heading #5 (Group: WR KINDER CH)

Item #19 1 Single door 141-A, KINDERGARTEN X131 To WASHROOM 141 90° LH

950 x 2150 x 44 - HM DR x HM FR

1	Continuous Hinge	Ives 112HD-83" US28	US28
1	Latchset	Schlage ND10S RHO 626 NO ALTERNATE	626
2	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D MTD BOTH SIDES	US32D
1	Wall Door Stop	Gallery GSH 250B C32D	US3



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Heading #6 (Group: EXTERIOR, SGL, STORAGE)

Item #20	1 Single door X144-A, EXTERIOR From SPRINKLER X144		90° RHR
	1000 x 2150 x 44 - HM DR x HM FR		
1	Continuous Hinge	Ives 112HD-83" US28	US28
1	Dead Lock	Schlage L460RD 626 RHR CMK , GMK	626
1	Door Pull	Gallery 2616H C32D	US32D
	INSTALL INSIDE		
1	Door Pull	CBH CBH 350 26D	US26D
	INSTALL EXTERIOR		
1	Surface Closer	LCN 4040XP HCUSH AL	AL
1	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
1	Threshold	K.N. Crowder CT-45 X 1219MM AL	
1	Weatherstripping	K.N. Crowder W-20S-CA x 1219MM	CA
1	Weatherstripping	K.N. Crowder W-24S-CA x 1219MM	CA
2	Weatherstripping	K.N. Crowder W-50S-CA - 2150	CA
1	Miscellaneous Item	Schlage DPS BY SECURITY CONTRACTOR	



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #7 (Group: ENTRANCE F0001A-DBL D)

Item #21

1 Pair of doors 100-A, EXTERIOR From VESTIBULE 100

90° LHRA/RHRA

1000, 1000 x 2150 x 44 - AL DR x ALUM FR

FIXED MULLION BY FRAME SUPPLIER

2	Continuous Hinge	Ives 112HD-83" US28	US28
1	Exit Device	Von Duprin CD-35A-DT-626- Door 44--386DT/626	626/626
1	Exit Device	Von Duprin CD35A-NL-626- 44--386NL/626	626/626
1	Cylinder	Schlage 20-057 -626 GMK X 2 KEYS	626
2	Cylinder	Schlage 20-061 1 1/4 "626 -XQ11-949 CMK, GMK	626
1	Cylinder	Schlage 20-061 626 1 1/8" CYL , CMK, GMK	626
1	Electric Strike	Von Duprin 6300- 24VDC-630	630
1	Surface Closer	LCN 4040XP EDA ST3068 689	AL
1	Surface Closer	LCN 4040XP -18PA	AL
1	Electronic Closer	GYROTECH AUTO OPERATOR GT8710 X PULL SIDE x DR WIDTH 628 NO ALTERNATE	628
2	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
2	Overhead Door Stop	Glynn-Johnson 104S US32D	US32D
2	Threshold	K.N. Crowder CT-45 X 1219MM AL	
2	Weatherstripping	K.N. Crowder W-24S-CA x 1219MM	CA
2	Miscellaneous Item	Schlage DPS BY SECURITY CONTRACTOR	
2	Miscellaneous Hardware	Camden ACTUATOR CM-60/4	
1	Miscellaneous Hardware	CARD READER / INTERCOM BY SECURITY CONTRACTOR	
1	Miscellaneous Hardware	Camden CM-1230-7224	
1	Miscellaneous Hardware	Camden CM-160/22	
2	Miscellaneous Hardware	Camden ESCUTCHEON CM-89S SS 630	
1	Miscellaneous Hardware	DS MULLION BY FRAME SUPPLIER	
1	Miscellaneous Hardware	Camden RELAY CX-33	
2	Miscellaneous Hardware	WS WEATHERSTRIP BY ALUM DDR/FR SUPPLIER	

Hardware supplier div 08710 to supply and install Auto Operator.

Mount keyswitch on operator header box ,keyswitch to enable and disable inside and outside actuators.
keyswitch CM1230 shunts power to exterior actuator only during lockdwon. LED is red.

INTEGRATION OF OPERATOR WITH AIPHONE AND ANY BIULDING SECURITY IS BY SECURITY CONTRACTOR.



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #8 (Group: Entrance Foyer 100.1b)

Item #22 1 Pair of doors 100-B, VESTIBULE 100 From CORRIDOR 114 90° LHRA/RHRA

1000, 1000 x 2150 x 44 - HM DR x HM FR

FIXED MULLION BY FRAME SUPPLIER

2	Continuous Hinge	Ives 112HD-83" US28	US28
2	Door Pull	Gallery 4012-2 C32D	US32D
2	Push Bar	Von Duprin 350 US28	US28
1	Surface Closer	LCN 4040XP EDA ST3068 689	AL
1	Electronic Closer	GYROTECH AUTO OPERATOR GT8710 X DR WIDTH HEADER 628 NO ALTERNATE	628
2	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
2	Overhead Door Stop	Glynn-Johnson 105S US32D	US32D
2	Miscellaneous Hardware	Camden ACTUATOR CM-60/4	
1	Miscellaneous Hardware	Camden CM-160/22	
2	Miscellaneous Hardware	Camden ESCUTCHEON CM-89S SS 630	
1	Miscellaneous Hardware	DS MULLION BY FRAME SUPPLIER	
1	Miscellaneous Hardware	WIRING DIAGRAM BY DIV. 08710	

1) Hardware supplier div 08710 to supply and install Auto Operator.

1) Mount keyswitch on operator header box ,keyswitch to enable and disable inside and outside actuators.

Heading #9 (Group: CLASS RM SEC CL)

Item #23 1 Single door 102-A, CORRIDOR 114 To OFFICE 102 90° LH

Item #24 1 Single door 103-A, CORRIDOR 114 To STAFF RM 103 90° LH

950 x 2150 x 44 - HM DR x HM FR

6	Standard Hinge	Ives 5BB1HW 4 1/2" x 4" 652	652
2	Lockset	Schlage ND78 R RHO -IR 47342586 626 GMK NO ALTERNATE	626
2	Surface Closer	LCN 4040XP EDA AL - LH	AL
2	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
2	Wall Door Stop	Gallery GSH 250B C32D	US3



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #10 (Group: CLASS RM SEC CL)

Item #25	1 Single door 104-A, CORRIDOR 114 To KITCHEN 104	90° LH
Item #26	1 Single door 203-A, CORRIDOR 214 To STAFF RESOURCE 203	90° LH

950 x 2150 x 44 - HM DR x HM FR - 1HR

6	Standard Hinge	Ives 5BB1HW 4 1/2" x 4" 652	652
2	Lockset	Schlage ND78 R RHO -IR 47342586 626 GMK NO ALTERNATE	626
2	Surface Closer	LCN 4040XP EDA AL - LH	AL
2	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
2	Wall Door Stop	Gallery GSH 250B C32D	US3

Heading #11 (Group: STORAGE NO CL OHS)

Item #27	1 Single door 104A-A, KITCHEN 104 To WALK-IN PANTRY 104A	90° RH
Item #28	1 Single door 203A-A, STAFF RESOURCE 203 From STORAGE 203A	90° LHR

950 x 2150 x 44 - HM DR x HM FR

6	Standard Hinge	Ives 5BB1 4 1/2" x 4" 652	652
2	Lockset	Schlage ND80 R RHO 626 GMK NO ALTERNATE	626
2	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
2	Overhead Door Stop	Glynn-Johnson 904S US32D	US32D



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #12 (Group: WR OP 950)

Item #29	1 Single door 105-A, CORRIDOR 114 To BF WASHROOM 105	90° LH
Item #30	1 Single door 213-A, CORRIDOR 214 To BF WASHROOM 213A	90° LH

950 x 2150 x 44 - HM DR x HM FR

6	Standard Hinge	Ives 5BB1HW 4 1/2" x 4" 652	652
2	Lockset	Schlage ND80 R RHO 626 GMK NO ALTERNATE	626
2	Electric Strike	Von Duprin 6211- FS 24VAC-630 FAIL SAFE	630
2	Electronic Closer	GYROTECH AUTO OPERATOR GT8710 X PULL SIDE x DR WIDTH 628 NO ALTERNATE	628
4	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D MTD BOTH SIDES	US32D
2	Wall Door Stop	Gallery GSH 250B C32D	US3
2	Miscellaneous Hardware	Camden CM-160/22	
2	Miscellaneous Hardware	Camden CX-WC13AXFM-PS	
2	Miscellaneous Hardware	Camden CX-WEC10K2	
2	Miscellaneous Hardware	Camden RELAY CX-33	
2	Miscellaneous Hardware	WIRING DIAGRAM BY DIV. 08710	

1) Hardware supplier div 08710 to supply and install Auto Operator.

2) Div 16 to provide 120vac to head of frame and run all LVW in conduit to all electrical components. As per wiring Diagram provided by Hardware supplier.

Heading #13 (Group: CLASS RM ,WS, SC)

Item #31	1 Single door 106-A, CORRIDOR 114 To LAUNDRY 106	90° RH
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950 x 2150 x 44 - HM DR x HM FR

3	Standard Hinge	Ives 5BB1 4 1/2" x 4" 652	652
1	Lockset	Schlage ND70 R RHO 626 GMK NO ALTERNATE	626
1	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
1	Wall Door Stop	Gallery GSH 250B C32D	US3
1	Weatherstripping	K.N. Crowder W-50S-CA 1 X 48" , 2 X 96"	CA
1	Gasketing	K.N. Crowder CT-54 M.F. X DR WIDTH w/shim	



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #14 (Group: MECH RM , 1200)

Item #32 1 Single door 107-A, CORRIDOR 114 To CUSTODIAL & MECHANICAL 107 90° LH

1100 x 2150 x 44 - HM DR x HM FR - 1HR

3	Standard Hinge	Ives 5BB1HW 5" x 4 1/2" 652	652
1	Lockset	Schlage ND80 R RHO 626 GMK NO ALTERNATE	626
1	Surface Closer	LCN 4040 XP REG 689 - LH	AL
1	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
1	Wall Door Stop	Gallery GSH 250B C32D	US3
1	Weatherstripping	K.N. Crowder W-50 C.A. 48" x 84"	C.A.
1	Gasketing	K.N. Crowder CT-54 M.F. X DR WIDTH w/shim	

Heading #15 (Group: STORAGE CL DEL ACT)

Item #33 1 Single door 108-A, CORRIDOR 114 To STROLLER STORAGE 108 90° LH

950 x 2150 x 44 - HM DR x HM FR

3	Standard Hinge	Ives 5BB1 4 1/2" x 4" 652	652
1	Lockset	Schlage ND80 R RHO 626 GMK NO ALTERNATE	626
1	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
1	Wall Door Stop	Gallery GSH 250B C32D	US3

Heading #16 (Group: CLASS RM SEC FG CH)

Item #34 1 Single door 109-A, CORRIDOR 114 To INFANT 109 90° RH
 Item #35 1 Single door 110-A, CORRIDOR 114 To TODDLER 110 90° RH
 Item #36 1 Single door 111A, CORRIDOR 114 To TODDLER 111 90° LH
 Item #37 1 Single door 112A, CORRIDOR 114 To PRE-SCHOOL 112 90° RH
 Item #38 1 Single door 113A, CORRIDOR 114 To PRE-SCHOOL 113 90° LH

950 x 2150 x 44 - HM DR x HM FR

5	Continuous Hinge	Ives 112HD-83" US28	US28
5	Lockset	Schlage ND78 R RHO -IR 47342586 626 GMK NO ALTERNATE	626
5	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
5	Wall Door Stop	Gallery GSH 250B C32D	US3
5	Miscellaneous Item	Zero FINGER GUARD 51A-120 NO ALTERNATE	A



Commercial Doors & Hardware Ltd.
 2150 Winston Park Drive, Unit 16
 Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #17 (Group: N132CC)

Item #39	1 Single door 109-B, EXTERIOR From INFANT 109	90° LHR
Item #40	1 Single door 111C-C, EXTERIOR From VESTIBULE 111C	90° LHR
Item #41	1 Single door 113B-C, EXTERIOR From VESTIBULE 113B	90° RHR

950 x 2150 x 50 - AL DR x ALUM FR

3	Continuous Hinge	Ives 112HD-83" US28	US28
2	Exit Device	Von Duprin CD35A-NL-626-950 50-LHR-386NL/626	626/626
1	Exit Device	Von Duprin CD35A-NL-626-950 50-RHR-386NL/626	626/626
3	Cylinder	Schlage 20-057 -626 GMK X 2 KEYS	626
3	Cylinder	Schlage 20-061 1 1/4 "626 -XQ11-949 CMK, GMK	626
3	Electric Strike	Von Duprin 6300- 24VDC-630	630
2	Surface Closer	LCN 4040XP EDA ST3068 689 - LHR	AL
1	Surface Closer	LCN 4040XP EDA ST3068 689 - RHR	AL
2	Surface Closer	LCN 4040XP -18PA - LHR	AL
1	Surface Closer	LCN 4040XP -18PA - RHR	AL
3	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
3	Overhead Door Stop	Glynn-Johnson 104S US32D	US32D
3	Threshold	K.N. Crowder CT-45 X 1219MM AL	
3	Weatherstripping	K.N. Crowder W-24S-CA x 1219MM	CA
3	Miscellaneous Item	Schlage DPS BY SECURITY CONTRACTOR	
3	Miscellaneous Item	Zero FINGER GUARD 51A-120 NO ALTERNATE	A
3	Miscellaneous Hardware	Security CARD READER BY SECURITY CONTRACTOR	
3	Miscellaneous Hardware	WS WEATHERSTRIP BY ALUM DDR/FR SUPPLIER	

Heading #18 (Group: STORAGE WS, FG)

Item #42	1 Single door 109A-A, INFANT 109 To STORAGE 109A	90° RH
Item #43	1 Single door 111B-A, TODDLER 110 To STORAGE 111B	90° LH
Item #44	1 Single door 111B-B, TODDLER 111 To STORAGE 111B	90° RH

950 x 2150 x 44 - HM DR x HM FR

3	Continuous Hinge	Ives 112HD-83" US28	US28
3	Lockset	Schlage ND80 R RHO 626 GMK NO ALTERNATE	626
3	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
3	Wall Door Stop	Gallery GSH 250B C32D	US3
3	Miscellaneous Item	Zero FINGER GUARD 51A-120 NO ALTERNATE	A



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #19 (Group: HALF DR)

Item #45 1 Single door 109B-A, INFANT 109 To WASHROOM 109B 90° LH

950 x 1200 x 44 - HM DR x HM FR

1	Continuous Hinge	Ives 112HD-48" US28	US28
1	Securing Device	Canaropa H601C15 - LH	US15
1	Wall Door Stop	Gallery GSH 250B C32D	US3
1	Miscellaneous Item	Zero FINGER GUARD 51A-120 NO ALTERNATE	A

Heading #20 (Group: CLASS RM SEC FG OH)

Item #46 1 Single door 109C-A, INFANT 109 To SLEEPING 109C 90° RH

950 x 2150 x 44 - HM DR x HM FR

1	Continuous Hinge	Ives 112HD-83" US28	US28
1	Lockset	Schlage ND78 R RHO -IR 47342586 626 GMK NO ALTERNATE	626
1	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
1	Overhead Door Stop	Glynn-Johnson 904S US32D	US32D
1	Miscellaneous Item	Zero FINGER GUARD 51A-120 NO ALTERNATE	A

Heading #21 (Group: WR WS, FG)

Item #47 1 Single door 110A-A, TODDLER 110 To WASHROOM 110A 90° LH
 Item #48 1 Single door 111A-A, TODDLER 111 To WASHROOM 111A 90° RH
 Item #49 1 Single door 112A-A, PRE-SCHOOL 112 To WASHROOM 112A 90° RH
 Item #50 1 Single door 113A-A, PRE-SCHOOL 113 To WASHROOM 113A 90° RH

950 x 2150 x 44 - HM DR x HM FR

4	Continuous Hinge	Ives 112HD-83" US28	US28
4	Latchset	Schlage ND10S RHO 626 NO ALTERNATE	626
8	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
		MTD BOTH SIDES	
4	Wall Door Stop	Ives WS401/402CCV US26D	US26D
4	Miscellaneous Item	Zero FINGER GUARD 51A-120 NO ALTERNATE	A



Commercial Doors & Hardware Ltd.
 2150 Winston Park Drive, Unit 16
 Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #22 (Group: VEST ,SGL PP, FG)

Item #51	1 Single door 111C-A, VESTIBULE 111C From TODDLER 110	90° LHR
Item #52	1 Single door 111C-B, VESTIBULE 111C From TODDLER 111	90° RHR
Item #53	1 Single door 113B-A, VESTIBULE 113B From PRE-SCHOOL 112	90° LHR
Item #54	1 Single door 113B-B, VESTIBULE 113B From PRE-SCHOOL 112	90° RHR

950 x 2150 x 44 - HM DR x HM FR

4	Continuous Hinge	Ives 112HD-83" US28	US28
4	Door Pull	Gallery 4012-2 C32D	US32D
4	Push Plate	CBH CBH 923 US32D 127 x 508 630	US32D
2	Surface Closer	LCN 4040XP EDA AL - LHR	AL
2	Surface Closer	LCN 4040XP EDA AL - RHR	AL
4	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
4	Wall Door Stop	Ives WS401/402CCV US26D	US26D
4	Miscellaneous Item	Zero FINGER GUARD 51A-120 NO ALTERNATE	A



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #23 (Group: VEST PR EXITS RM)

Item #55

1 Pair of doors 114A, CORRIDOR 114 From CORRIDOR X142

90° LHRA/RHRA

1000, 1000 x 2150 x 44 - HM DR x HM FR

KEYED REM HARDWARE MULLION WITH ELECTRICAL DISCONNECT.

2	Continuous Hinge	Ives 112HD-83" US28	US28
1	Removable Mullion	Von Duprin KR4854--689 -BLANK	689
2	Exit Device	Von Duprin 98-L US26D 996L-R US26D #06 Lever	626/626
2	Cylinder	Schlage 20-057 -626 GMK X 2 KEYS	626
1	Cylinder	Schlage 20-061 X 1 1/4" LFIC 626 GMK	626
1	Electric Strike	Von Duprin 6300- 24VDC-630	630
2	Surface Closer	LCN 4040XP EDA AL	AL
2	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
2	Wall Door Stop	Gallery GSH 250B C32D	US3
2	Weatherstripping	K.N. Crowder W-21 48" x 84"	
2	Weatherstripping	K.N. Crowder W-24S-CA x 1219MM	CA
1	Weatherstripping	K.N. Crowder W-25-CA x 85"	CA
1	Miscellaneous Hardware	Security CARD READER BY SECURITY CONTRACTOR	

1) Hardware supplier div 08710 to supply and install Auto Operator.

1) Mount keyswitch on operator header box ,keyswitch to enable and disable inside and outside actuators.



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #24 (Group: VEST PR , OP, ULC)

Item #56 1 Pair of doors F1A, STAIRS F1 From CORRIDOR 114 90° LHRA/RHRA

1000, 1000 x 2150 x 44 - HM DR x HM FR - 1HR

2	Continuous Hinge	Ives 112HD-83" US28	US28
1	Removable Mullion	Von Duprin KR9854--689- 499F BLANK	689
2	Exit Device	Von Duprin 98L-F BE X 996L- BE (hand) #06 Lever 4' Bar	US26D/US26D
1	Cylinder	Schlage 20-061 X 1 1/4" LFIC 626 GMK	626
1	Electric Strike	Von Duprin 6300- 24VDC-630	630
		INSTALL OP LEAF	
1	Surface Closer	LCN 4040XP EDA AL	AL
1	Electronic Closer	GYROTECH AUTO OPERATOR GT8710 X DR WIDTH HEADER 628 NO ALTERNATE	628
2	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
1	Overhead Door Stop	Glynn-Johnson 105S US32D	US32D
1	Wall Door Stop	Gallery GSH 250B C32D	US3
2	Miscellaneous Hardware	Camden ACTUATOR CM-60/4	
1	Miscellaneous Hardware	Camden CM-160/22	
2	Miscellaneous Hardware	Camden ESCUTCHEON CM-89S SS 630	
1	Miscellaneous Hardware	Camden RELAY CX-33	
1	Miscellaneous Hardware	WIRING DIAGRAM BY DIV. 08710	

1) Hardware supplier div 08710 to supply and install Auto Operator.

1) Mount keyswitch on operator header box ,keyswitch to enable and disable inside and outside actuators.



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #25 (Group: Entrance)

Item #57

1 Pair of doors F1B, EXTERIOR From STAIRS F1

90° LHRA/RHRA

1000, 1000 x 2150 x 50 - AL DR x ALUM FR

2	Continuous Hinge	Ives 112HD-83" US28	US28
1	Removable Mullion	Von Duprin KR4854--689 -BLANK	689
1	Exit Device	Von Duprin CD-35A-DT-626- Door 50--386DT/626	626/626
1	Exit Device	Von Duprin CD35A-NL-626- 50--386NL/626	626/626
1	Cylinder	Schlage 20-057 -626 GMK X 2 KEYS	626
2	Cylinder	Schlage 20-061 1 1/4 "626 -XQ11-949 CMK, GMK	626
1	Cylinder	Schlage 20-061 626 1 1/8" CYL , CMK, GMK	626
1	Cylinder	Schlage 20-061 X 1 1/4" LFIC 626 GMK	626
1	Electric Strike	Von Duprin 6300- 24VDC-630	630
1	Surface Closer	LCN 4040XP EDA ST3068 689	AL
1	Surface Closer	LCN 4040XP -18PA	AL
1	Electronic Closer	GYROTECH AUTO OPERATOR GT8710 X DR WIDTH HEADER 628 NO ALTERNATE	628
2	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
2	Overhead Door Stop	Glynn-Johnson 104S US32D	US32D
2	Threshold	K.N. Crowder CT-45 X 1219MM AL	
2	Weatherstripping	K.N. Crowder W-24S-CA x 1219MM	CA
2	Miscellaneous Item	Schlage DPS BY SECURITY CONTRACTOR	
2	Miscellaneous Hardware	Camden ACTUATOR CM-60/4	
1	Miscellaneous Hardware	Security CARD READER BY SECURITY CONTRACTOR	
1	Miscellaneous Hardware	Camden CM-1230-7224	
1	Miscellaneous Hardware	Camden CM-160/22	
2	Miscellaneous Hardware	Camden ESCUTCHEON CM-89S SS 630	
1	Miscellaneous Hardware	Camden RELAY CX-33	
1	Miscellaneous Hardware	WS WEATHERSTRIP BY ALUM DDR/FR SUPPLIER	
1	Miscellaneous Hardware	WIRING DIAGRAM BY DIV. 08710	

Hardware supplier div 08710 to supply and install Auto Operator.

Mount keyswitch on operator header box ,keyswitch to enable and disable inside and outside actuators.
keyswitch CM1230 shunts power to exterior actuator only during lockdwon. LED is red.

INTEGRATION OF OPERATOR WITH AIPHONE AND ANY BIULDING SECURITY IS BY SECURITY CONTRACTOR.



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #26 (Group: ENTRANCE FM)

Item #58

1 Pair of doors F1C, EXTERIOR From STAIRS F1

90° LHRA/RHRA

1000, 1000 x 2150 x 50 - AL DR x ALUM FR

FIXED MULLION BY FRAME SUPPLIER

2	Continuous Hinge	Ives 112HD-83" US28	US28
1	Exit Device	Von Duprin CD-35A-DT-626- Door 50--386DT/626	626/626
1	Exit Device	Von Duprin CD35A-NL-626- 50--386NL/626	626/626
1	Cylinder	Schlage 20-057 -626 GMK X 2 KEYS	626
2	Cylinder	Schlage 20-061 1 1/4 "626 -XQ11-949 CMK, GMK	626
1	Cylinder	Schlage 20-061 626 1 1/8" CYL , CMK, GMK	626
1	Electric Strike	Von Duprin 6300- 24VDC-630	630
1	Surface Closer	LCN 4040XP EDA ST3068 689	AL
1	Surface Closer	LCN 4040XP -18PA	AL
1	Electronic Closer	GYROTECH AUTO OPERATOR GT8710 X DR WIDTH HEADER 628 NO ALTERNATE	628
2	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
2	Overhead Door Stop	Glynn-Johnson 104S US32D	US32D
2	Threshold	K.N. Crowder CT-45 X 1219MM AL	
2	Weatherstripping	K.N. Crowder W-24S-CA x 1219MM	CA
2	Miscellaneous Item	Schlage DPS BY SECURITY CONTRACTOR	
2	Miscellaneous Hardware	Camden ACTUATOR CM-60/4	
1	Miscellaneous Hardware	Security CARD READER BY SECURITY CONTRACTOR	
1	Miscellaneous Hardware	Camden CM-1230-7224	
1	Miscellaneous Hardware	Camden CM-160/22	
2	Miscellaneous Hardware	Camden ESCUTCHEON CM-89S SS 630	
1	Miscellaneous Hardware	DS MULLION BY FRAME SUPPLIER	
1	Miscellaneous Hardware	Camden RELAY CX-33	
1	Miscellaneous Hardware	WS WEATHERSTRIP BY ALUM DDR/FR SUPPLIER	
1	Miscellaneous Hardware	WIRING DIAGRAM BY DIV. 08710	

Hardware supplier div 08710 to supply and install Auto Operator.

Mount keyswitch on operator header box ,keyswitch to enable and disable inside and outside actuators.
keyswitch CM1230 shunts power to exterior actuator only during lockdwon. LED is red.

INTEGRATION OF OPERATOR WITH AIPHONE AND ANY BIULDING SECURITY IS BY SECURITY CONTRACTOR.



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #27 (Group: STAIR SGL)

Item #59	1 Single door 200-A, CORRIDOR 212 From LEARNING COMMONS 200	90° RHR
Item #60	1 Single door 200-B, CORRIDOR 212 From LEARNING COMMONS 200	90° LHR

950 x 2150 x 44 - HM DR x HM FR

6	Standard Hinge	Ives 5BB1HW 4 1/2" x 4" 652	652
2	Lockset	Schlage ND78 R RHO -IR 47342586 626 GMK NO ALTERNATE	626
1	Surface Closer	LCN 4040XP EDA AL - LHR	AL
1	Surface Closer	LCN 4040XP EDA AL - RHR	AL
2	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
2	Wall Door Stop	Gallery GSH 250B C32D	US3
2	Weatherstripping	K.N. Crowder W-50 C.A. 48" x 84"	C.A.
2	Gasketing	K.N. Crowder CT-54 M.F. X DR WIDTH w/shim	

Heading #28 (Group: STORAGE , WS)

Item #61	1 Single door 201-A, CORRIDOR 214 To ELECTRICAL 201	90° RH
----------	---	--------

950 x 2150 x 44 - HM DR x HM FR - 1HR

3	Standard Hinge	Ives 5BB1 4 1/2" x 4" 652	652
1	Lockset	Schlage ND80 R RHO 626 GMK NO ALTERNATE	626
1	Surface Closer	LCN 1461 AL-REG MTD.	AL
1	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
1	Wall Door Stop	Gallery GSH 250B C32D	US3

Heading #29 (Group: CLASS RM , SEC , WS)

Item #62	1 Single door 202-A, CORRIDOR 214 To SEMINAR 202	90° LH
Item #63	1 Single door 206-A, CORRIDOR 214 To CLASSROOM 206	90° LH
Item #64	1 Single door 207-A, CORRIDOR 214 To CLASSROOM 207	90° RH
Item #65	1 Single door 208-A, CORRIDOR 214 To CLASSROOM 208	90° LH
Item #66	1 Single door 209-A, CORRIDOR 214 To CLASSROOM 209	90° RH
Item #67	1 Single door 210-A, CORRIDOR 214 To CLASSROOM 210	90° LH

950 x 2150 x 44 - HM DR x HM FR

18	Standard Hinge	Ives 5BB1 4 1/2" x 4" 652	652
6	Lockset	Schlage ND78 R RHO -IR 47342586 626 GMK NO ALTERNATE	626
6	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
6	Wall Door Stop	Gallery GSH 250B C32D	US3



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Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #30 (Group: CLASS RM SEC OHS)

Item #68	1 Single door 205-A, CORRIDOR 214 To RESOURCE 205A	90° LH
Item #69	1 Single door 211-A, CORRIDOR 212 To CLASSROOM 211	90° LH

950 x 2150 x 44 - HM DR x HM FR

6	Standard Hinge	Ives 5BB1 4 1/2" x 4" 652	652
2	Lockset	Schlage ND78 R RHO -IR 47342586 626 GMK NO ALTERNATE	626
2	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D	US32D
2	Overhead Door Stop	Glynn-Johnson 904S US32D	US32D

Heading #31 (Group: VEST PR, PP, FG)

Item #70	1 Pair of doors 212-A, CORRIDOR X201 From CORRIDOR 212	90° LHRA/RHRA
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1000, 1000 x 2150 x 44 - HM DR x HM FR

FIXED MULLION BY DOOR SUPPLIER

2	Continuous Hinge	Ives 112HD-83" US28	US28
2	Door Pull	Gallery 4012-2 C32D	US32D
2	Push Bar	Von Duprin 350 US28	US28
2	Surface Closer	LCN 4040XP EDA AL	AL
2	Kick Plate	CBH CBH 903 200 X 900 US32D	US32D
2	Overhead Door Stop	Glynn-Johnson 105S US32D	US32D
2	Weatherstripping	K.N. Crowder W-21 48" x 84"	
2	Weatherstripping	K.N. Crowder W-24S-CA x 1219MM	CA
1	Weatherstripping	K.N. Crowder W-25-CA x 85"	CA
1	Miscellaneous Hardware	DS MULLION BY FRAME SUPPLIER	



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2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Heading #32 (Group: VEST PR, ULC, RM)

Item #71	1 Pair of doors F2A, STAIR F2 From CORRIDOR 214	90°,180° LHRA/RHRA
	1000, 1000 x 2150 x 44 - HM DR x HM FR - 1HR	
2	Continuous Hinge	Ives 112HD-83" US28
1	Removable Mullion	Von Duprin KR9954 -499F SP28
2	Exit Device	Von Duprin 98L-F 996L 06 US26D
2	Cylinder	Schlage 20-057 -626 GMK X 2 KEYS
1	Cylinder	Schlage 20-061 X 1 1/4" LFIC 626 GMK
2	Surface Closer	LCN 4040XP EDA AL
2	Kick Plate	CBH CBH 903 200 X 50MM LDW US32D
2	Wall Door Stop	Gallery GSH 250B C32D
2	Weatherstripping	K.N. Crowder W-21 48" x 84"
2	Weatherstripping	K.N. Crowder W-24S-CA x 1219MM
1	Weatherstripping	K.N. Crowder W-25-CA x 85"

Heading #33 (Group: Teachers Closet)

Item #72	1 Elevation TCLOCKS	
	___ x ___ x ___ - WD DR x WD FR	
	7-TC CLOSETS SGL LOCK	
7	Miscellaneous Hardware	Schlage CL777R FSIC 626 GMK
	BALANCE OF HARDWARE SUPPLIED BY MILLWORK SUPPLIER.	

Heading #34 (Group: Misc)

Item #73	1 Elevation MISC	
	___ x ___ x ___ - HM DR x HM FR	
2	CHG KEYS PER LOCK KEYED TO OWNERS REQUIREMENTS.	
2	CONSTRUCTION CONTROL KEYS	
5	CONSTRUCTION KEYS	
3	GMK A SCHLAGE	
1	KEY SCHEDULE PREPARED FOR OWNERS APPROVAL .	
10	MASTER KEYS SCHLAGE	
3	PERMANENT CONTROL KEYS	



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25



DOOR CONTROL RELAYS

DOOR CONTROL

CX-33: ADVANCED LOGIC RELAY

CX-33 is a 'state of the art' door controller designed for 'universal' operation in virtually any automatic door application. This compact unit is small enough to fit inside most door operator cases. It provides a large 3 segment LED and simple push buttons for the easiest programming, and supports illuminated signage in restroom applications. It also leads the market with a range of exclusive operating features, including time duration in airlock applications and protection of automatic door operators when utilizing magnetic locks.

Features

- 15 operating modes with sub-modes
- Easily sequence multiple inputs with multiple maintain and hold outputs
- New V3.2 Features Include:
 - Lock Down Mode
 - Delayed Relay Activation
 - Selectable N.O or N.C. Inputs
- Large 3 segment (blue) LED display
- Outstanding power filtering and surge protection
- Selectable time delays with delay on input activation
- Larger terminal strips
- 12V to 24V AC/DC
- 3 year warranty

MODEL

CX-33	Advanced Logic Relay
-------	----------------------



Specifications

Voltage:	12V to 24V AC/DC
Current Draw:	105mA Typical, 320mA Max
Response Time:	0.5 Seconds
Display:	Blue Multi-Segment LED
Input:	4 x Dry 1 x Wet: min. 5V AC/DC N/O or N/C Selectable
Output:	3 x Form C (SPDT)
Contact Rating:	3A @ 30 VDC
Temp Range:	-22°F to +185°F (-30°C to +85°C)
Time Delay:	Hold 1 timer: 0-50 Seconds Delay 1 Timer: 0-15 Seconds Hold 2 timer: 0-50 Seconds Delay 2 timer: 0-60 Seconds Hold 3 Timer: 0-50 Seconds Delay on Activate: 0-10 Seconds
Dimensions:	2"H x 6"W x 7/8"D (51mm x 152mm x 22mm)

CX-33PS: ADVANCED LOGIC RELAY, POWER SUPPLY AND CABINET

The industry leading CX-33 Advanced Logic Relay is available in a metal cabinet that centralizes all door control system components; a 12/24 VDC power supply module, and color coded termination blocks for quick and easy installation.

Features

- Rugged and compact metal cabinet
- Pre-wired with large terminal block for easy access
- Removable door with option for cabinet lock
- Five convenient conduit knockouts; one per side
- 12/24V DC power supply, 2 Amp. (UL listed)
- Available as part of Camden Restroom Control Kits (See pages 34-37).
- Short circuit and thermal overload protection
- 3 year warranty

MODEL

CX-33PS	Advanced Logic Relay, 2 Amp, Power Supply Cabinet and Transformer
---------	---

Option

'L'	Add suffix 'L' to model number for Cabinet Lock
-----	---



Specifications

Voltage:	16V to 28V AC/DC
Output:	12V or 24 VDC
Current:	2 Amps
Temp Range:	32°F to +120°F (0°C to +49°C)
Dimensions:	11-1/16" H x 7-7/8"W x 2-13/16"D 281mm x 200mm x 72mm)



DOOR CONTROL

CX-WC: BARRIER FREE RESTROOM CONTROL KITS



MODELS	
CX-WC13AXFM	FLUSH MOUNT COMBO ILLUMINATED PUSH PLATE SYSTEM (1) CX-33 Advanced Logic Relay (1) CM-2520/4854SE1 Combo switch, 2" x 4" narrow 'PUSH TO OPEN' & 'PUSH TO LOCK', Flush mount AURA™ illuminated enclosure and sign (1) CM-45/454SE1 4-1/2" Square (concealed screws) push plate, with sounder, illuminated RED/GREEN/BLUE flush mount CM-55i box; Double sided. 'DOOR LOCKED WHEN 'RED' / 'UNLOCKED WHEN GREEN' AND 'OCCUPIED WHEN RED' / 'VACANT WHEN GREEN'; 'WHEELCHAIR' symbol and 'PUSH TO OPEN', blue (1) CX-MDA Magnetic contact, surface, SPST, white Add suffix 'F' for French and 'FE' for bilingual
	SURFACE MOUNT COMBO ILLUMINATED PUSH PLATE SYSTEM (1) CX-33PS Advanced Logic Relay, 2 Amp Power Supply, Cabinet and Transformer (1) CM-2520/4854SE1 Combo switch, 2" x 4" narrow 'PUSH TO OPEN' & 'PUSH TO LOCK', Surface mount AURA™ illuminated enclosure and sign (1) CM-45/454SE1 4-1/2" Push plate switch, wheelchair & 'PUSH TO OPEN' with Surface mount AURA™ illuminated enclosure and sign (1) CX-ED2079 Grade 2 ANSI electric strike with 3 faceplates (1) CX-MDA Magnetic contact, surface, SPST, white Add suffix 'F' for French and 'FE' for bilingual
CX-WC13AXSM-PS	FLUSH MOUNT COMBO ILLUMINATED PUSH PLATE SYSTEM (1) CX-33PS Advanced Logic Relay, 2 Amp Power Supply, Cabinet and Transformer (1) CM-2520/4855SE1 Combo switch, 2" x 4" narrow 'PUSH TO OPEN' & 'PUSH TO LOCK', Flush mount AURA™ illuminated enclosure and sign (1) CM-45/455SE1 4-1/2" Push plate switch, wheelchair & 'PUSH TO OPEN' with Flush mount AURA™ illuminated enclosure and sign (1) CX-ED2079 Grade 2 ANSI electric strike with 3 faceplates (1) CX-MDA Magnetic contact, surface, SPST, white Add suffix 'F' for French and 'FE' for bilingual
	SURFACE MOUNT TWO DOOR RESTROOM SYSTEM (1) CX-EMF2 Multi-Function Relay Controller (2) CM-2520/4854SE1 Combo switch, 2" x 4" narrow 'PUSH TO OPEN' & 'PUSH TO LOCK', Surface mount AURA™ illuminated enclosure and sign (2) CM-45/454SE1 4-1/2" Push plate switch, wheelchair & 'PUSH TO OPEN' with Surface mount AURA™ illuminated enclosure and signs (2) CX-MDA Magnetic contact, surface, SPST, white Add suffix 'F' for French and 'FE' for bilingual
CX-WC14AXSM	FLUSH MOUNT TWO DOOR RESTROOM SYSTEM (1) CX-EMF2 Multi-Function Relay Controller (2) CM-2520/4854SE1 Combo switch, 2" x 4" narrow 'PUSH TO OPEN' & 'PUSH TO LOCK', Flush mount AURA™ illuminated enclosure and sign (2) CM-45/454SE1 4-1/2" Push plate switch, wheelchair & 'PUSH TO OPEN' with Flush mount AURA™ illuminated enclosure and signs (2) CX-MDA Magnetic contact, surface, SPST, white Add suffix 'F' for French and 'FE' for bilingual
	FLUSH MOUNT TWO DOOR RESTROOM SYSTEM (1) CX-EMF2 Multi-Function Relay Controller (2) CM-2520/4854SE1 Combo switch, 2" x 4" narrow 'PUSH TO OPEN' & 'PUSH TO LOCK', Flush mount AURA™ illuminated enclosure and sign (2) CM-45/454SE1 4-1/2" Push plate switch, wheelchair & 'PUSH TO OPEN' with Flush mount AURA™ illuminated enclosure and signs (2) CX-MDA Magnetic contact, surface, SPST, white Add suffix 'F' for French and 'FE' for bilingual



CX-WC13AXFM



CX-WC13AXSM-PS



CX-WC13AXFM-PS



CX-WC14AXSM



CX-WC14AXFM

RESTROOM CONTROL KITS



DOOR CONTROL

CX-WC: BARRIER FREE RESTROOM CONTROL KITS

MODELS	
CX-WC17	COLUMN™ SWITCH RESTROOM SYSTEM KIT (2) CM-7536/4 'Push to Open' Switches (1) CM-7536/8B 'Push to Lock' (Red) Switch (2) CM-AF503 LED Annunciators (with 'Occupied' and 'Locked' Message Labels) (1) CX-33 Controller (1) CX-MDA Surface Magnetic Contacts Add suffix 'F' for French and 'FE' for bilingual
CX-WC17VR-PS	COLUMN™ SWITCH RESTROOM SYSTEM KIT WITH POWER SUPPLY & HANDS-FREE SENSORS (2) CM-7536VR/4 'Push to Open' Column™ Switches and Signs (1) CM-7536VR/8B 'Push to Lock' (Red) Column™ Switch and Sign (1) CX-33PS Controller and Power Supply Cabinet (1) CX-ED2079 Grade 2 Electric Strike (1) CX-MDA Surface Magnetic Contacts Add suffix 'F' for French and 'FE' for bilingual



CX-WC17



CX-WC17VR-PS

CX-WEC SERIES: EMERGENCY CALL SYSTEMS FOR UNIVERSAL RESTROOMS



Listed Components



Compliant

CX-WEC Series are equipment packages designed to meet the latest building code requirements for universal restrooms. Emergency Call Systems may be installed in restrooms without an automatic door operator, or with Camden CX-WC Series barrier-free restroom kits (with operator).

Specifications

Current Draw: CX-WEC Series: 165mA

MODELS	
CX-WEC10	UNIVERSAL EMERGENCY CALL KIT (1) CM-450R/12 Mushroom Push button, single gang, stainless steel faceplate, push/pull, 'PRESS FOR EMERGENCY ASSISTANCE' (1) CM-AF501SO Single gang LED annunciator with adjustable sounder 'ASSISTANCE REQUESTED' (1) CM-AF141SO Single Gang LED Dome Light with sounder (1) CM-SE21A English, solid white sign, 'IN THE EVENT OF AN EMERGENCY PUSH EMERGENCY BUTTON AND AUDIBLE AND VISUAL SIGNAL WILL ACTIVATE'; For use without automatic door operator, or with CX-WC 10, 11, 12, 13 & 14 barrier-free restroom control kit. Add suffix 'F' for French and 'FE' for bilingual
CX-WEC10K2	UNIVERSAL EMERGENCY CALL SYSTEM KIT, WITH WHITE DOME LIGHT (1) CM-AF540SO Double gang, push/pull mushroom push button, red, 'Assistance Required', with LED annunciator & adjustable sounder, 'Assistance Requested' (1) CM-AF141SO Single Gang LED Dome Light with sounder (1) CM-SE21A English, solid white sign, 'IN THE EVENT OF AN EMERGENCY PUSH EMERGENCY BUTTON AND AUDIBLE AND VISUAL SIGNAL WILL ACTIVATE' Add suffix 'F' for French and 'FE' for bilingual



CX-WEC10



CX-WEC10K2

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2023 | PRODUCT GUIDE

37



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

ALL-ACTIVE SWITCHES



DOOR ACTIVATION DEVICES



CM-40, CM-41 & CM-60 SERIES: ROUND PUSH PLATE SWITCHES

CM-40, CM-41 and CM-60 Series 'All-Active' push plate switches are heavy-duty, ADA-compliant door controls. Faceplates are stainless steel or solid brass, and the assembly is designed for easy installation. The CM-41 4-1/2" square stainless steel backplate is large enough to cover a poorly installed electrical box. Also fits Camden 4-1/2" square surface boxes.

Features

- Durable stainless steel or brass construction
- 4 stud switch design and rubber dampers for quieter operation
- All-Active design requires minimal actuation force
- Weather resistant boot included
- Large variety of graphics options
- Available in a range of architectural finishes
- 3 year 'Camden Tough' warranty with '2 for 1' replacement

ROUND SWITCHES

CM-40	4-1/2" Round push plate switch, brushed stainless steel finish
CM-41	4-1/2" Round push plate switch, with square back plate, brushed stainless steel finish
CM-60	6" Round push plate switch, brushed stainless steel finish

NO-BATTERY KINETIC BY CAMDEN™ WIRELESS ROUND SWITCHES with built-in transmitter. Receiver required.

CM-40K	4-1/2" Round push plate switch, brushed stainless steel finish
CM-41K	4-1/2" Round push plate switch, with square back plate, brushed stainless steel finish
CM-60K	6" Round push plate switch, brushed stainless steel finish



Listed Components



Compliant



CM-40/2



CM-41/3



CM-60/4

Specifications

Voltage:	12/24V AC/DC
Contact Rating:	15A @ 30 VDC
Contact Type:	SPDT Form 'C'
Mounting:	CM-40/41: Single Gang CM-60: Single/Double Gang or 4 x 4
Switch Type:	Momentary
Std. Finish:	US32 / 630
Dimensions:	CM-40: 4-1/2" Diameter x 1-3/4"D (114mm x 44mm) CM-41: 4-1/2"H x 4-1/2"W x 1-3/4"D (114mm x 114mm x 44mm) CM-60: 6" Diameter x 1-1/8"D (152mm x 28.6mm)

OPTIONS (Add suffix to model above)

Faceplate Graphic Options



CM-xx/1



CM-xx/2



CM-xx/A2



CM-xx/2AL



CM-xx/2AR



CM-xx/3



CM-xx/3F



CM-xx/4



CM-xx/A4



CM-xx/4AL



CM-xx/4AR



CM-xx/4F



CM-xx/8



CM-xx/8B



CM-xx/8F



CM-xx/8D

Architectural Finishes

CM-xxx-AB	Antique Brass
CM-xxx-SB	Satin Brass

CM-xxx-OB	Oil Rub Bronze
CM-xxx-PB	Polished Brass

Water Tight Option

CM-xxx-WT
Boot & watertight coating

Contact Option

CM-xxx-DP
DPDT switch instead of SPDT

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Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25



ENCLOSURES AND MOUNTING BOXES

DOOR ACTIVATION DEVICES

CM-49, 79, 59S AND 89S: SURFACE AND FLUSH MOUNT ESCUTCHEONS (FOR ROUND PUSH PLATE SWITCHES)

Camden offers a range of **flame and vandal resistant** low profile escutcheons for mounting 4-1/2" and 6" round push plate switches. ABS escutcheons feature a patented 2-piece design and may be ordered as complete 'kits' or individual parts. Stainless steel escutcheons feature one piece heavy gauge construction.

Features

- Exclusive 2 piece ABS escutcheons can be surface mounted or mounted on in-wall single gang, double gang or 4" square electrical boxes
- Heavy gauge stainless steel escutcheons provide an attractive, rugged look
- ABS models are designed for use with Lazerpoint RF™ 915 Mhz. wireless wall switch transmitters

FOR 4-1/2" ROUND SWITCH - STAINLESS STEEL ESCUTCHEON

CM-59S Surface, Round, Standard Depth. Heavy gauge stainless steel, 7-3/4" x 1-1/18"D

FOR 4-1/2" ROUND SWITCH - ABS SPACESHIP ESCUTCHEON

CM-49 Surface/Flush Mount Kit, includes **CM-49A, CM-49B, CM-49C & CM-49G**, 8-3/4" x 2"D

CM-49A Flush enclosure only (fits single gang box), 7" x 13/16"D

CM-49AK Flush Mount Kit, includes **CM-49A, CM-49C & CM-49G**, (fits single, double and 4 x 4 boxes), 7" x 13/16"D

CM-49B Surface mount enclosure only (must be used with **CM-49A**), 8-3/4" x 1"D

CM-49C Adapter plate for mounting on double gang or 4" Square box, 4" x 1/16"D

CM-49G Gasket for **CM-49A** OR **CM-49B**, 6-1/4" x 1/8"D

FOR 6" ROUND SWITCH - STAINLESS STEEL ESCUTCHEON

CM-89S Surface, round standard depth. Heavy gauge stainless steel, 9-5/8" x 1-1/2"D

FOR 6" ROUND SWITCH - ABS SPACESHIP ESCUTCHEON

CM-79 Surface/Flush Mount Kit, includes **CM-79A, CM-79B, CM-49C & CM-79G**, 9-5/8" x 2"D

CM-79A Flush enclosure only (fits single gang box), 8" x 3/4"D

CM-79AK Flush Mount Kit, includes **CM-79A, CM-49C & CM-79G**, (fits single, double and 4 x 4 boxes), 8" x 3/4"D

CM-79B Surface mount enclosure only (must be used with **CM-79A**), 9-5/8" x 1-1/8"D

CM-79G Gasket for **CM-79A** or **CM-79B**, 7-1/4" x 1/8"D



CM-59S



CM-49A CM-49B
(Shown with TX-9 Transmitter)



CM-89S



CM-79A CM-79B
(Shown with TX-9 Transmitter)



KEY SWITCHES

DOOR ACTIVATION DEVICES

CM-1200 / CM-2200 SERIES: FLUSH MOUNT KEY SWITCHES - STAINLESS STEEL FACEPLATE

'Camden Tough' stainless steel key switches are available in narrow and single gang widths. The preassembled switch mounting bracket is designed to minimize installation time. They accept virtually any 1" - 1-1/4" mortise cylinder (sold separately) and cam.

Features

- Heavy duty stainless steel faceplate
- Complete range of 1 and 2 switch SPST, SPDT and DPDT models, momentary and maintained, left and/or right operation
- Locators prevent cylinders from spinning
- Accepts standard mortise cylinders, 1" - 1-1/4"
- Tamper proof screws and driver supplied
- Indoor or outdoor applications
- 3 year warranty



CM-1200

CM-2200

(Mortise cylinders sold separately)

Note: See page 96 & 98 for LED and faceplate options

SINGLE GANG KEY SWITCHES

CM-1200	Flush mount key switch, SPST Momentary, N/O
CM-1205	Flush mount key switch, SPST Momentary, N/C
CM-1210	Flush mount key switch, SPST Maintained
CM-1220	Flush mount key switch, SPDT N.O. & N.C. Momentary
CM-1230	Flush mount key switch, SPDT N.O. & N.C. Maintained
CM-1250	Flush mount key switch, (2) SPDT Momentary
CM-1260	Flush mount key switch, (2) SPDT Maintained
CM-1270	Flush mount key switch, SPDT Momentary and SPDT Maintained
CM-1280	Flush mount key switch, DPDT Momentary
CM-1282	Flush mount key switch, (2) DPDT Momentary
CM-1290	Flush mount key switch, DPDT Maintained
CM-1292	Flush mount key switch, (2) DPDT Maintained

NARROW KEY SWITCHES

CM-2200	Flush mount key switch, SPST Momentary, N/O
CM-2205	Flush mount key switch, SPST Momentary, N/C
CM-2210	Flush mount key switch, SPST Maintained
CM-2220	Flush mount key switch, SPDT Momentary
CM-2230	Flush mount key switch, SPDT Maintained
CM-2250	Flush mount key switch, (2) SPDT Momentary
CM-2260	Flush mount key switch, (2) SPDT Maintained
CM-2270	Flush mount key switch, SPDT Momentary and SPDT Maintained
CM-2280	Flush mount key switch, DPDT Momentary
CM-2282	Flush mount key switch, (2) DPDT Momentary
CM-2290	Flush mount key switch, DPDT Maintained
CM-2292	Flush mount key switch, (2) DPDT Maintained

Specifications

Voltage:	12/24V AC/DC
Contact Rating:	6A @ 30 VDC
Switch Life:	100,000 cycles
Temp Range:	32°F - 85°F (0°C to +30°C)
Std. Finish:	US32 / C32D
Dimensions:	CM-1200 Series: 4-1/2"H x 2-3/4"W x 1-5/8"D (114mm x 70mm x 41mm) CM-2200 Series: 4-1/2"H x 1-3/4"W x 1-5/8"D (114mm x 44mm x 41mm)



AUTOMATIC DOOR CONTROL SWITCHES

DOOR ACTIVATION DEVICES

CM-160 / 170 / 180 SERIES: KEY SWITCHES

Key switches for automatic doors are designed for mounting on the door operator cabinet or door frame, and are available in a range of 2 or 3 position momentary or maintained models. The key cylinder and 2 keys are included.

Features

- Black lamacoid (plastic) or stainless steel faceplates
- Key removable in all maintained positions
- 2, 3, 4 position maintained and 2 position momentary models
- All switches are keyed alike

MODELS

CM-160	Key switch with plastic lamacoid (mini) faceplate
CM-170	Key switch with stainless steel (narrow stile) faceplate
CM-180	Key switch with stainless steel (single gang) faceplate

OPTIONS (Add suffix to model above)

Faceplate Graphics

MOMENTARY	MAINTAINED	MAINTAINED	MAINTAINED	MAINTAINED
CX-xx/20	CX-xx/21	CX-xx/22	CX-xx/23	CX-xx/24

Extra Keys

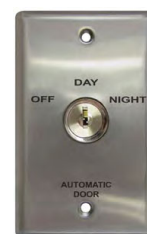
CM-A126	(2) Extra keys for CM-160, 170 and 180 series key switches
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CM-160/23



CM-170/21



CM-180/23

Specifications

Voltage:	12/24 VDC
Contact Rating:	4A @ 28 VDC
Switch Life:	100,000 cycles
Dimensions:	CM-160: 3" H x 1-11/16" W x 1-3/8" D (76mm x 42mm x 35mm) CM-170: 4-1/2" H x 1-3/4" W x 1-3/8" D (114mm x 44mm x 35mm) CM-180: 4-1/2" H x 2-3/4" W x 1-3/8" D (114mm x 70mm x 35mm)

CM-190 SERIES: TOGGLE SWITCH

CM-190 Series maintained toggle switches are designed to control automatic door operators, featuring a choice of faceplates, for mounting on the operator cabinet/wall.

Features

- Mini metal faceplate designed to install on door operator cabinet or door frame
- 2 or 3 position maintained operation
- Single gang faceplate for mounting on standard electrical box
- Heavy duty 6 Amp. contacts

MODELS

CM-190	Mini aluminum faceplate
CM-195	Single gang stainless steel faceplate

OPTIONS (Add suffix to model above)

Faceplate Graphics

	CX-xx/30		CX-xx/31
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CM-190/30



CM-195/31

Specifications

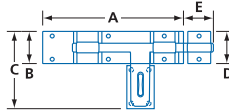
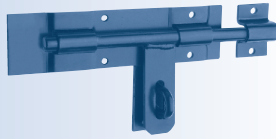
Voltage:	12/24 VDC
Contact Rating:	6A @ 30 VDC
Switch Life:	50,000 cycles
Temp Range:	-4°F - 185°F (-20°C - 85°C)
Dimensions:	CM-190: 2-5/8" H x 1-1/2" W x 2" D (59mm x 38mm x 51mm) CM-195: 4-1/2" H x 2-3/4" W x 2" D (114mm x 70mm x 51mm)

05.341

PADBOLTS & GATE LATCHES

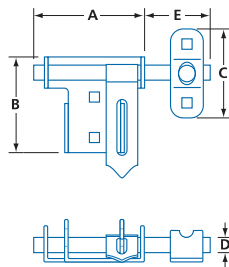
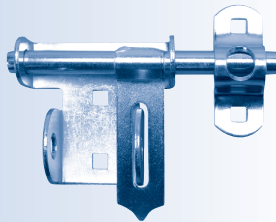
GENERAL HARDWARE

HEAVY-DUTY UTILITY PADBOLT



MODEL NUMBER	MATERIAL	FINISH	A	B	C	D	E THROW	MAX PADLOCK SHACKLE DIA	UNIT WEIGHT LBS / KG
1419	Steel	C1B, GV	10 (254)	2 1/2 (63.5)	5 3/4 (146)	2 1/2 (63.5)	2 (50.8)	5/8 (15.9)	2.66 / 1.21

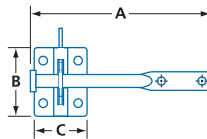
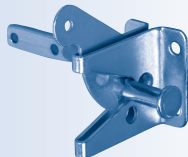
UNIVERSAL PADBOLT



- Can be padlocked in bolted or unbolted position

MODEL NUMBER	MATERIAL	FINISH	A	B	C	D DIA	E THROW	MAX PADLOCK SHACKLE DIA	PER BOX	BOX WEIGHT LBS / KG
2205	Steel	C2G	3 (76)	3 (76)	2 3/4 (70)	1/2 (12.7)	2 (50.8)	1/2 (12.7)	5	4.0 / 1.8

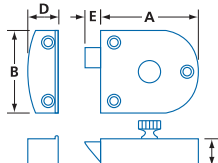
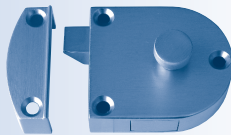
GATE LATCH



- Mounting hardware included: wood screws

MODEL NUMBER	MATERIAL	FINISH	A	B	C	MAX PADLOCK SHACKLE DIA	PER BOX	BOX WEIGHT LBS / KG
278	Steel	C2G	5 (127)	1 7/8 (47.6)	1 7/16 (36.5)	1/4 (6.4)	10	4.0 / 1.8

SECRET GATE LATCH



- Mounting hardware included: wood screws

MODEL NUMBER	MATERIAL	FINISH	A	B	C	D	E THROW	PER BOX	BOX WEIGHT LBS / KG
H601	Zinc die-cast	C15	2 1/4 (57)	1 15/16 (49.2)	5/8 (15.9)	11/16 (17.5)	3/8 (9.5)	10	3.7 / 1.7

Dimensions unless specified otherwise are: Inches (Millimeters)

www.canaropa.com

CDH

Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

71 Sheffield Street
Toronto, Ontario
M6M 3E9
Canada
Tel: 416-243-1166
Fax: 416-243-3352
Email: info@cbhmfmg.com
Web: www.cbhmfmg.com

All dimensions are in inches.
Product specifications are subject
to change. For the most updated
product features, contact our
customer service department.

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CBH 900/901/902/903

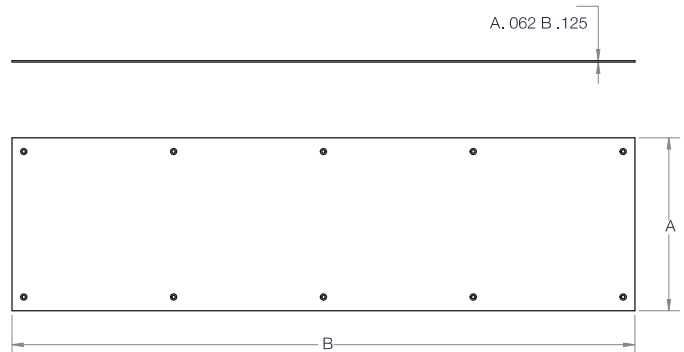
MATERIAL: ALUMINUM, BRASS,
BRONZE AND STAINLESS STEEL

FINISHES: ALL STANDARD

SKUS:
CBH 900-ALUMINUM KICKPLATE
CBH 901-BRASS KICKPLATE
CBH 902-BRONZE KICKPLATE
CBH 903-STAINLESS STEEL KICKPLATE

.050 GAUGE PLATES WILL BE SUPPLIED STANDARD.
FOR THICKER GAUGE PLATES USE SUFFIX

A. 062 B .125



CBH 900-ALUMINUM
CBH 901-BRASS
CBH 902-BRONZE
CBH 903-STAINLESS STEEL

KICKPLATE

All kickplates are drilled, countersunk and
supplied standard with #6 x 5/8 oval head
socket wood screws. Machine screws or tape
fastening is available upon request.

Kickplates available with bevelled edges at extra
cost. All tape Kickplates are bevelled edge.



Quality Craftsmanship Since 1978.

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M6M 3E9
Canada
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Fax: 416-243-3352
Email: info@cbhmfg.com
Web: www.cbhmfg.com

All dimensions are in inches.
Product specifications are subject
to change. For the most updated
product features, contact our
customer service department.

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Hardware MFG Inc.

CBH 920/921/922/923

MATERIAL: ALUMINUM, BRASS,
BRONZE AND STAINLESS STEEL

FINISHES: N/A

SKUS:
CBH 920-ALUMINUM PUSH PLATE
CBH 921-BRASS PUSH PLATE
CBH 922-BRONZE PUSH PLATE
CBH 923-STAINLESS STEEL PUSH
PLATE

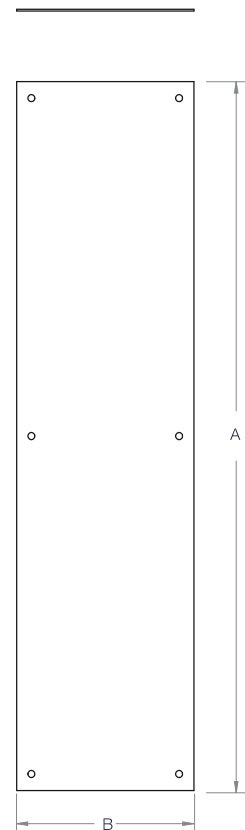


PUSHPLATE

All push plates are drilled and countersunk
with bevelled edges and supplied standard
with #6x5/8 socket wood screws. Machine
screws or tape are available upon request.

.050 GAUGE PLATES WILL BE SUPPLIED
STANDARD, FOR THICKER PLATES USE
SUFFIX

A .062
B .125



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GSH 250B WALL STOP

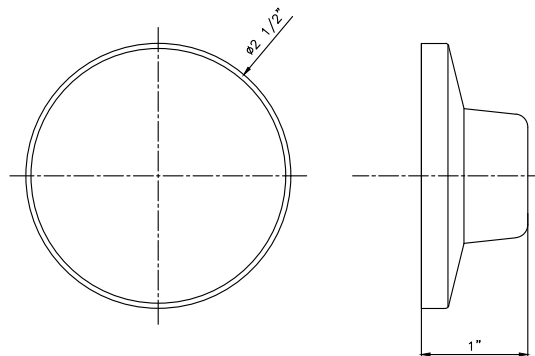
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- Back Plate Mounting
- Fasteners Included
- C3, C4, C10, C10B, and C32D



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Email: info@galleryspecialty.com

All product specifications are subject to change. For the most updated product features, contact our customer service department Toll Free at 1.800.267.1236

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56

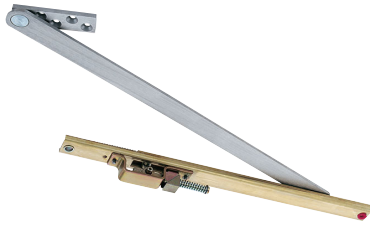
CDH

Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

100 Series concealed overhead door holders/stops



100 Series heavy-duty

Glynn-Johnson offers a complete line of overhead door holders and stops, accommodating virtually all openings with solutions for even the most complex door control problems. These concealed holders and stops provide the most attractive and reliable heavy-duty door control available.

Glynn-Johnson 100 Series holders and stops provide the most reliable and versatile concealed overhead door control. They are designed for installation on virtually all types of doors mounted on conventional type butt hinges, pivots, continuous hinges, swing clear hinges and numerous other specialty hinges. When used in conjunction with many surface-applied door closers, 100 Series holders and stops provide the most effective control for entrance doors and vestibule doors of all types, as well as heavy or often used interior doors. Templates provided allow for variable mounting positions, ranging from 85° - 110° of opening.

Five models:

- 100H Series hold-open model
- 100HP Series internal hold-open model
- 100F Series friction hold-open model
- 100S Series stop-only model
- 100SE Series special stop-only model

Six sizes:

- Each model comes in six sizes.
- Simple
- Standardized

Three options:

- ADJ—Adjustable jamb bracket
- CJ—Jamb Bracket for use with LCN 5030 closer
- SOC—Pin-in-socket security screw package

Unmatched convenience:

- Non-handed
- Improved compatibility with door closers
- Single/double-acting doors
- Interior/exterior applications

- Reduced door prep
- Durable
- Improved corrosion resistance
- Function conversion kits are available

Materials and finishes

In heavy gauge brass or 300 Series stainless steel, these models offer the broadest range of finishes in the industry, complementing any design and offering the highest resistance to corrosion. Available in the following finishes:

Finishes	Description
US3	Polished brass
US4	Satin brass
US10	Satin bronze
US10B	Oil rubbed bronze
US32	Polished stainless steel
US32D	Satin stainless steel
SP4	Powder coat brass
SP10	Powder coat bronze
SP28	Powder coat aluminum
SP313	Powder coat dark bronze
SPBLK	Powder coat black

Models

These models provide a wide range of optional features, and are ideal for use on entrance and vestibule doors, large doors, doors opened frequently, or doors subject to abuse. These models are also furnished with an offset-style jamb bracket.

Designed for heavy-duty applications, 100 Series models will provide long-lasting protection to doors, frames, hinges, related hardware and surrounding walls or obstructions.

100H Series hold-open

(Suffix H) The hold-open function should be used where it is desired to hold a door open at a predetermined position for short or long periods of time, permitting an unobstructed traffic flow through the opening.

These models are both selective and adjustable, featuring the most reliable hold-open mechanism available. They feature a control knob which protrudes from the face of the door and turns the hold-open function on or off. Set in the inactive position, the unit acts as a stop and shock absorber. The tension on the hold-open mechanism can be adjusted using an allen wrench to offset air currents or other exterior conditions. The hold-open tension adjustment is located in the bottom of the track in the top of the door.

90 Series surface overhead door holders/stops



90 Series heavy-duty

Glynn-Johnson 90 Series holders and stops are the most rugged models available for heavy-duty applications. The channel is thru-bolted to the door with sex bolts, and the jamb bracket is surface mounted to the jamb, requiring minimal door and frame preparation.

These versatile units can be used in conjunction with most surface-applied door closers. The provided templates allow for variable mounting positions, ranging from 85° to 110° hold-open/stop angle. These templates are designed for installation in almost all types of doors, including doors with conventional butt-type hinges or specialty hinges.

Four models:

- 90H Series hold-open model
- 90S Series stop-only model
- 90F Series friction hold-open model
- 90SE Series special stop-only model

Five sizes:

- Simple
- Standardized
- Each model is available in five sizes

Three options:

- J—Angle jamb bracket
- SHIM—Blade stop shim kits
- SOC—Pin-in-socket security screw package

Unmatched convenience:

- Non-handed
- Improved compatibility with door closers
- Single-acting doors
- Interior/exterior applications
- Durable
- Easy to install
- Improved corrosion resistance
- Function conversion kits available

Materials and finishes

In 300 Series stainless steel, brass and steel substrates, these models are available in the largest selection of finishes in the industry. Stainless steel models offer the highest resistance to corrosion. Available in the following finishes:

BHMA	US	Finish description
605	US3	Polished Brass
606	US4	Satin Brass
612	US10	Satin Bronze
613	US10B	Oil Rubbed Bronze
619	US15	Satin Nickel
625	US26	Polished Chrome
643E/716	—	Aged Bronze, Blackened, Edge Relieved
652	—	Satin Chrome
706	SP4	Powder Coat Brass
691	SP10	Powder Coat Bronze
689	SP28	Powder Coat Aluminum
695	SP313	Powder Coat Dark Bronze
622	SPBLK	Powder Coat Black

Models

Glynn-Johnson 90 Series door holders and stops provide long-lasting protection for doors, frames and hardware. All models incorporate a heavy-duty channel/slide-arm design and offset jamb bracket. This unique design allows for simple field modification of functions, should user requirements change.

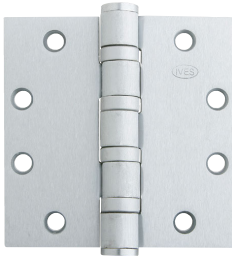
90H Series hold-open

(Suffix H) Hold-open models provide a convenient method of holding the door open at a predetermined position for short or long periods of time, permitting an unobstructed traffic flow through the opening. The hold-open function can easily be turned on or off by simply rotating the serrated knob on the bottom of the channel. This knob engages the hold-open mechanism, allowing the door to be held open at a predetermined position ranging from 85° to 110°. When the knob is flipped over, it acts as a stop and shock absorber.

The tension on the hold-open mechanism can be adjusted using a phillips screwdriver to offset air currents or other exterior conditions. The hold-open tension adjustment is located on the top of the slider in the channel.

IVES® Architectural hinges

A12 Hinges & pivots	B Pulls & plates	C Flush bolts & coordinators	D Latches, catches & bolts	E Stops	F Exterior hardware	G Miscellaneous hardware
-------------------------------	----------------------------	--	--------------------------------------	-------------------	-------------------------------	------------------------------------



5BB1HW 5 Knuckle, ball bearing, heavy weight full mortise hinge

- Recommended for heavier weight doors (>150 lbs)
- Recommended for high frequency usage (400 cycles per day)
- Made with four ball bearing assemblies
- Recommended for use with a door closer
- Packed with fasteners for hollow metal and wood doors
12-24 x 1/2 UFPHMS, 12 x 1 1/4 FPHWS

Certifications

- Certified to ANSI/BHMA A156.1 for performance standards
- Meets ANSI/BHMA 156.7 for template hinge dimensions
- UL Classified for windstorm rated assemblies - R37965
- UL Listed, 3 hour fire doors

Material substrate

- Made from brass, 1040 steel, or 304 series stainless steel

Options

- NRPNon-removable pin
- HT.....Hospital tip
- SH.....Security stud - comes standard with NRP
- RC-1/4, RC-5/8.....Rounded corners
- SECSecurity fasteners - pin-in-socket
- TW4Four wire
- TW4MFour wire with monitor
- TW8Eight wire
- TW8MEight wire with monitor
- TW12.....Twelve wire
- MONMonitor

Dimensions

Height x Width	Size (mm)	Gauge
4,5 x 4	114 x 102	0,180
4,5 x 4,5	114 x 114	0,180
5 x 4,5	127 x 114	0,190
5 x 5	127 x 127	0,190

Refer to General Hinge Information page to determine proper hinge for application

5BB1HW Finishes

BHMA	Description	Substrate	Finish
600	Primer paint	Steel	USP
605	Bright brass	Brass	US3
606	Satin brass	Brass	US4
612	Satin bronze	Brass	US10
613	Oil rubbed bronze	Brass	US10B
614	Oxidized bronze	Brass	US10A
616	Blackened bronze	Brass	US11
619	Satin nickel	Brass	US15
622	Matte black	Brass	B-BLK
625	Bright chrome	Brass	US26
626	Satin chrome	Brass	US26D
643e/716	Aged bronze	Brass	B-643e/716
629	Bright stainless	Stainless steel	US32
630	Satin stainless	Stainless steel	US32D
631	Matte black	Steel	F-BLK
632	Bright brass	Steel	US3
633	Satin brass	Steel	US4
639	Satin bronze	Steel	US10
640	Oil rubbed bronze	Steel	US10B
641	Oxidized bronze	Steel	US10A
643	Blackened bronze	Steel	US11
646	Satin nickel	Steel	US15
651	Bright chrome	Steel	US26
652	Satin chrome	Steel	US26D
643e/716	Aged bronze	Steel	F-643e/716

For other colors, consult factory.

A12

Ives Architectural hardware products

CDH

Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Hinges and pivots

Aluminum geared continuous hinges

General information

ANSI/BHMA Certified

All Ives aluminum geared hinges are certified to ANSI/BHMA 156.26, Grade 1
XY models: Grade 1 150lb and 300lb door test
HD models: Grade 1 150lb door test

UL Listed

All Ives Aluminum geared hinges are tested and approved UL 10C (90 minutes).

Material

6063-T6 Aluminum.

Hinge duty

All Ives Aluminum geared hinges are heavy duty (XY and HD models).

XY model -
slot adjustability

XY model - bearings

HD model



XY models

- Rounded gear design for extended life and smoother operation
- Patented, center loaded, interlocking bearing design which helps handle the opening and closing of the door better over time (all sizes have 37 bearings)
- XY mounting slot adjustability on all full and half surface models to help with installation
- Frame guidance lip is extended further for retrofit applications to cover existing heavy weight architectural hinge preps
- Improved aesthetics with a curved, articulating cover design which eliminates pinch points

HD models

Features transmission gear design with bearings that are evenly spaced every 3" on center - Amount of bearings varies by size

- 83" - 32 Bearings
- 85" - 32 Bearings
- 95" - 36 Bearings
- 120" - 47 Bearings

Standard lengths

83", 85", 95", 119" (XY models), 120" (HD models)
custom lengths available up to 119", consult factory.
Handing required for 224HD.

28 • Ives • Architectural hardware products

Finishes

BHMA	US	Description	Base material
628	US28	Clear Aluminum Anodized	Aluminum
710	313AN	Dark Bronze Anodized	Aluminum
711	315AN	Black Anodized (XY only)	Aluminum

Custom finishes available, consult factory.

Field modifications

Ives aluminum geared continuous hinges can be cut to length from both ends during installation.

XY models

The unique mounting pattern of the XY hinge allows it to be cut down to 69" while still having double row fasteners regardless of the original length of the hinge. Requires the hinge to be cut from both ends. Example: A 119" hinge can have 25" removed from each end to make it a 69" long hinge.

HD models

The unique mounting pattern allows to cut up to 6" from bottom while still having double row fasteners. If cut more than 13.5", other modifications may be necessary.

Door weight

For doors up to 200 lbs, no door reinforcement is required. For doors between 200 and 450 lbs a 16 gauge channel in the frame is required. For doors up to 600 lb, rivet nuts are required in the frame in addition to the frame reinforcement. Max door width of 4'0". For specific door weight reinforcement requirements per model, view the installation instructions and individual product pages for detail.

Lifetime warranty

Ives continuous hinges carry a limited lifetime warranty with exception of electrified continuous hinges, which carry a 12 month warranty from time of shipment.

Learn more at us.allegion.com/warranty.

Hinges and pivots

Aluminum geared continuous hinges

112HD

Full mortise - narrow frame and door leaf

- For 1 3/4" doors
- Spread bearing design
- Non-handed for custom cut lengths
- Flush mounted, no inset
- 48" Maximum door width
- Beveled or square edge doors
- For doors weighing up to 450 pounds without reinforcing, 600 pounds with reinforcing

Specifications

Standard length	83", 85", 95", 120"
Standard mounting hardware	12-24 x 3/4" Steel self drilling/self tapping Phillips-head screw
Certifications	<ul style="list-style-type: none"> Exceeds Grade 1 ANSI/BHMA 156.26 for 150lbs and 300lbs UL10C listed (90 min)

Options

EPT	Electric power transfer
-----	-------------------------

Optional mounting hardware

SECHM	Security screws - hollow metal door and frame
SECWDHM	Security screws - 1/2 wood, 1/2 hollow metal
SECWDWD	Security screws - wood door and frame
TEKSWD	1/2 Self drill, self tap 1/2 wood
TF	Thread forming screws
WD	Wood door and frame

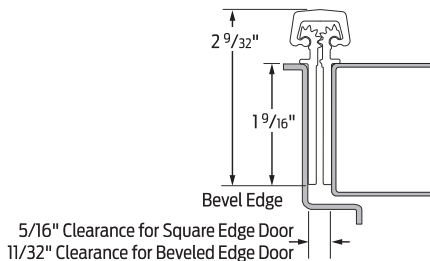
Finishes

BHMA	Description	Substrate	Finish
628	Clear Aluminum Anodized	Aluminum	US28
710	Dark Bronze Anodized	Aluminum	313AN
711	Black Anodized	Aluminum	315AN

Custom anodizing and painting are available, consult factory

For single door applications:

For pairs of doors see chart and general information.



Introduction

Table of contents

Hinges and pivots

Pulls, push bars and plates

Flush bolts, strikes and coordinators

Latches, catches and bolts

Door stops, holders and silencers

Exterior hardware

Miscellaneous hardware

Architectural hardware products • Ives • 41

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2150 Winston Park Drive, Unit 16
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Door stops, holders and silencers

Wall bumpers and stops

WS401/WS402CVX, WS401/WS402CCV

Wall bumpers (convex and concave models)

- Constructed in heavy-duty cast brass
- Special retainer ring makes rubber tamper resistant
- Grey rubber bumper
- WS401/402CVX – convex rubber bumper, packed with fasteners for drywall/wood applications
- WS401/402CCV – concave rubber bumper which avoids damage to locks with projecting buttons, packed with fasteners for drywall/wood applications



WS401/WS402CCV

Specifications

Material substrate	Made from cast brass
Certifications	<ul style="list-style-type: none"> WS401/402CVX Meets ANSI/BHMA 156.16, L12101 WS401/402CCV Meets ANSI/BHMA 156.16, L12251

Dimensions

Base diameter	Base thickness	Overall projection
2 1/2"	3/8"	1"

Finishes

BHMA	Description	Substrate	Finish
605	Bright Brass	Brass	US3
606	Satin Brass	Brass	US4
612	Satin Bronze	Brass	US10
613	Oil Rubbed Bronze	Brass	US10B
619	Satin Nickel	Brass	US15
625	Bright Chrome	Brass	US26
626	Satin Chrome	Brass	US26D

For other colors, consult factory.

Note: WS401/402 is the full part number, 401 and 402 are not different products.

WS404CVX

Wall stop (convex)

- Compact size
- Constructed in cast brass
- Totally concealed mounting discourages vandalism or tampering
- Unit furnished with grey convex rubber bumper
- Packed with fasteners for drywall/wood applications

Specifications

Material substrate	Made from cast brass
--------------------	----------------------

Dimensions

Base diameter	Overall projection
1"	17/32"

Finishes - brass

BHMA	Description	Substrate	Finish
605	Bright Brass	Brass	US3
606	Satin Brass	Brass	US4
609	Blackened Brass	Brass	US5
612	Satin Bronze	Brass	US10
613	Oil Rubbed Bronze	Brass	US10B
619	Satin Nickel	Brass	US15
622	Matte Black	Brass	BLK
625	Bright Chrome	Brass	US26
626	Satin Chrome	Brass	US26D
—	Aged Bronze	Brass	643e/716

For other colors, consult factory.

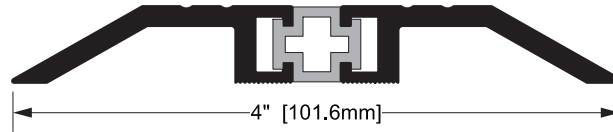
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1/2" THERMAL BREAK THRESHOLDS

CT-44

EXTRUDED ALUMINUM
WITH RIGID P.V.C.

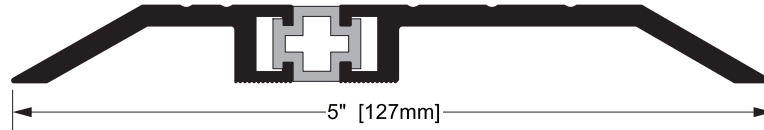


4" [101.6mm]



CT-45

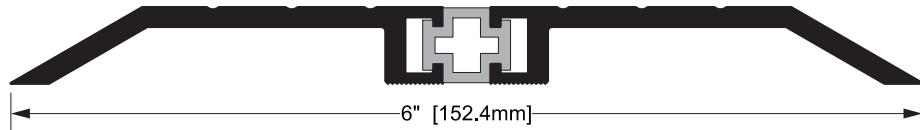
EXTRUDED ALUMINUM
WITH RIGID P.V.C.



5" [127mm]

CT-46

EXTRUDED ALUMINUM
WITH RIGID P.V.C.

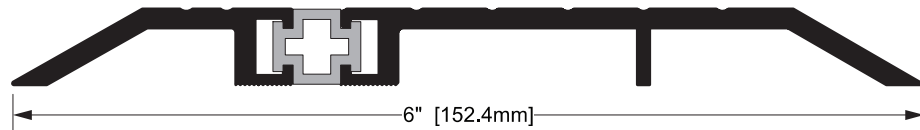


6" [152.4mm]

CT-44-1

CT-42-1

FROST INSERT



6" [152.4mm]

CT-44-1

CT-43-1

FROST INSERT

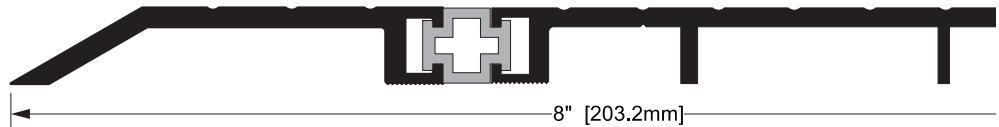


7" [177.8mm]

CT-45-1

CT-43-1

FROST INSERT



8" [203.2mm]

CT-42-1

CT-43-1

FROST INSERT



9" [228.6mm]

CT-43-1

CT-43-1

FROST INSERT



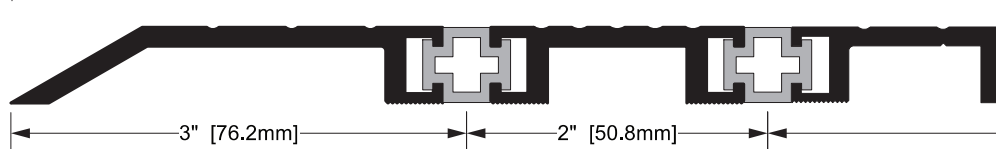
10" [254mm]

CT-45-1

CT-41-1

CT-43-1

FROST INSERT



3" [76.2mm]

2" [50.8mm]

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A PRODUCT OF K. N. CROWDER MFG. INC.

AUTOMATIC DOOR BOTTOMS

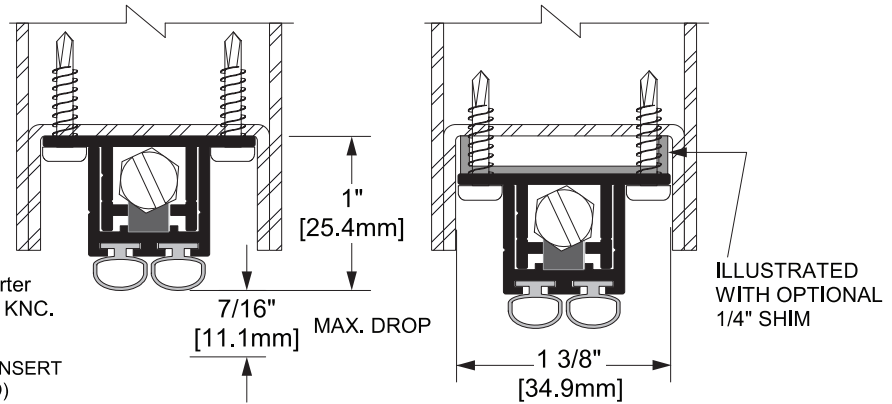
CT-54



EXTRUDED
ALUMINUM AND VINYL

Designed to fit the recess of a standard hollow metal door. Available from stock sizes of 24", 30" 36", 42" and 48". *Stock sizes can be shortened up to 6" except 24" which can be shortened to 21". Longer and shorter sizes fabricated to order - contact KNC.

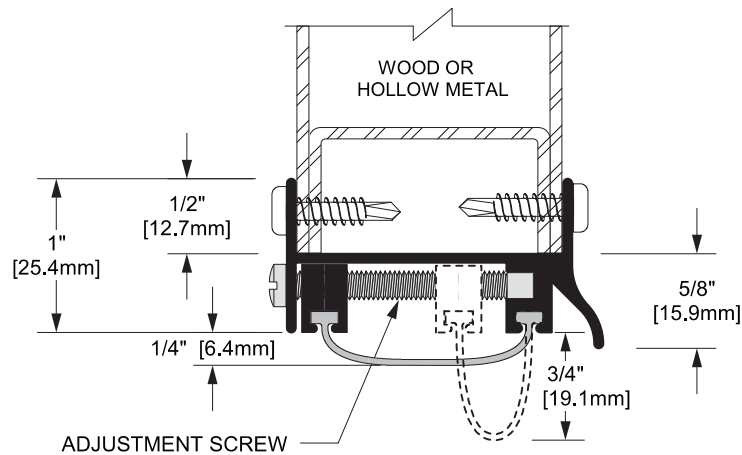
CT-54N C/W NEOPRENE INSERT
(NOT FIRE RATED)



ADJUSTABLE DOOR SHOE

CT-730

ADJUSTABLE DOOR SHOE
EXTRUDED ALUMINUM AND
VINYL. FOR 1-3/4" DOORS



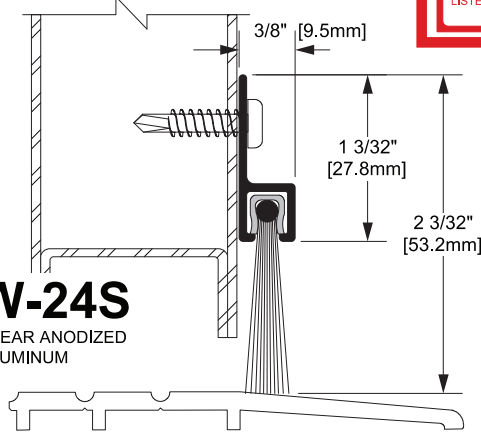
SWEEPS



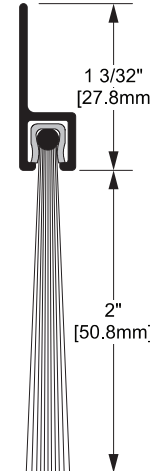
ALL PRODUCTS
ON THIS PAGE



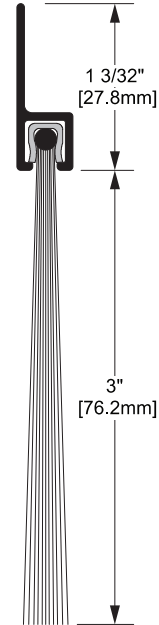
W-24S
CLEAR ANODIZED
ALUMINUM



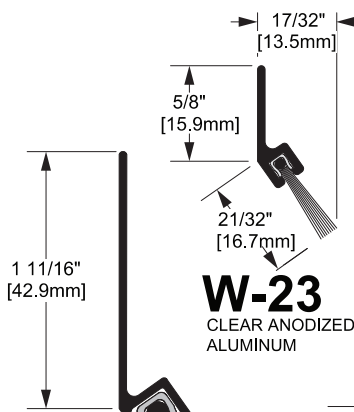
W-33S
CLEAR ANODIZED
ALUMINUM



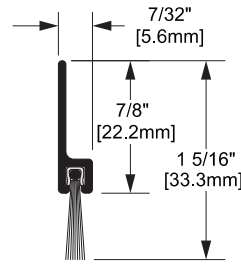
W-34S
CLEAR ANODIZED
ALUMINUM



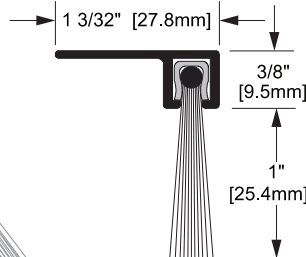
W-23
CLEAR ANODIZED
ALUMINUM



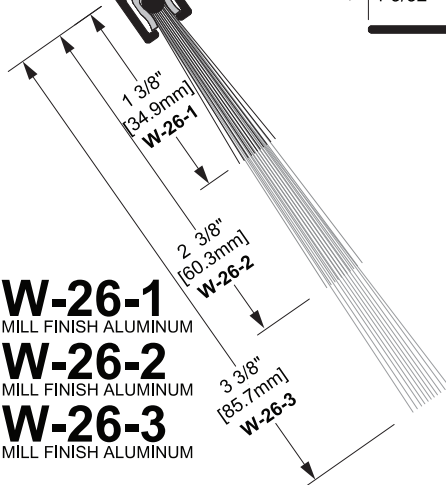
W-25S
CLEAR ANODIZED
ALUMINUM



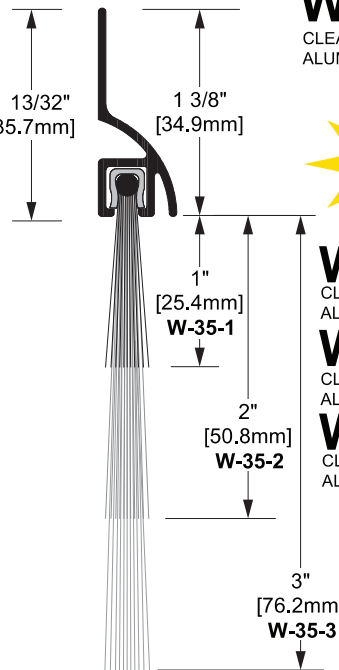
W-37-1
CLEAR ANODIZED
ALUMINUM



W-26-1
MILL FINISH ALUMINUM
W-26-2
MILL FINISH ALUMINUM
W-26-3
MILL FINISH ALUMINUM



W-35-1
CLEAR ANODIZED
ALUMINUM
W-35-2
CLEAR ANODIZED
ALUMINUM
W-35-3
CLEAR ANODIZED
ALUMINUM



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27

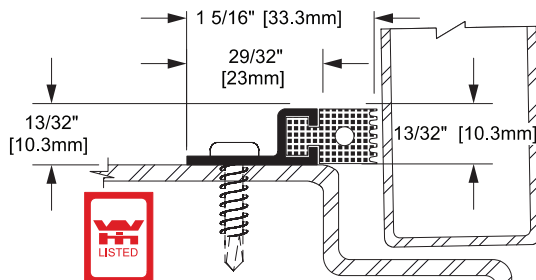
CDH

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2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

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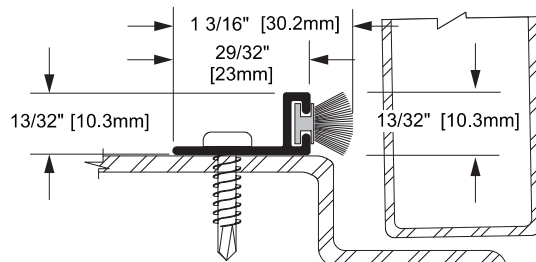
Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

WEATHERSTRIP



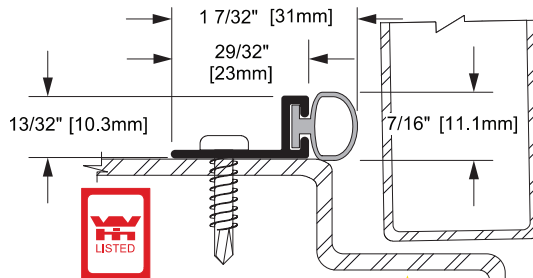
W-16N

CLEAR ANODIZED ALUMINUM
AND EXTRUDED NEOPRENE



W-16P

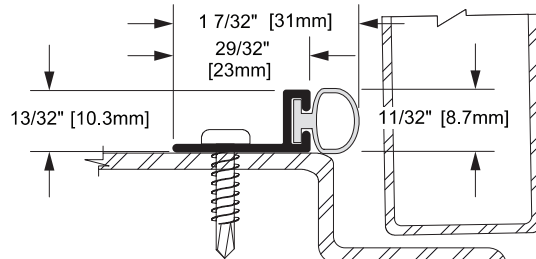
CLEAR ANODIZED ALUMINUM
AND PILE WITH FIN SEAL



W-16S

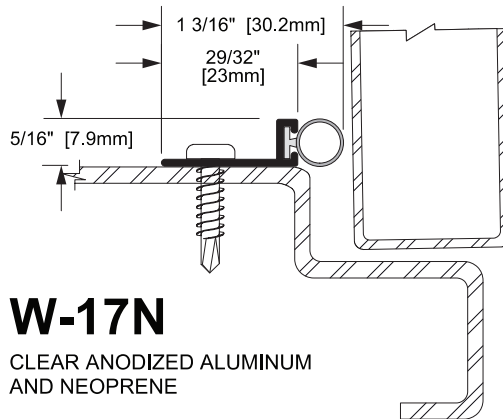
CLEAR ANODIZED ALUMINUM
AND SILICONE SEAL

NEW



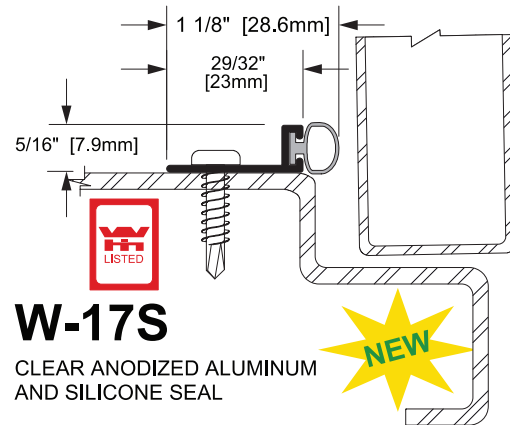
W-16V

CLEAR ANODIZED ALUMINUM
AND VINYL



W-17N

CLEAR ANODIZED ALUMINUM
AND NEOPRENE



W-17S

CLEAR ANODIZED ALUMINUM
AND SILICONE SEAL

NEW

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29

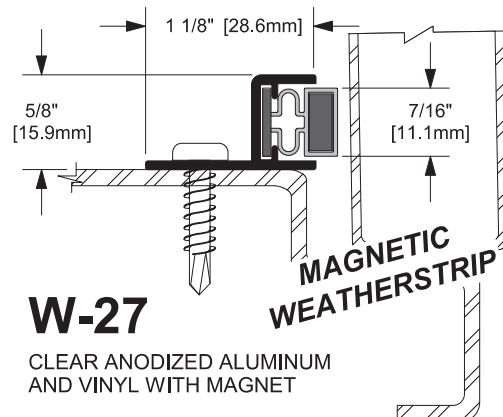
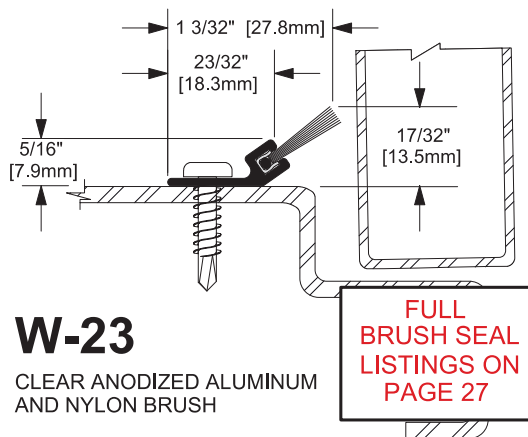
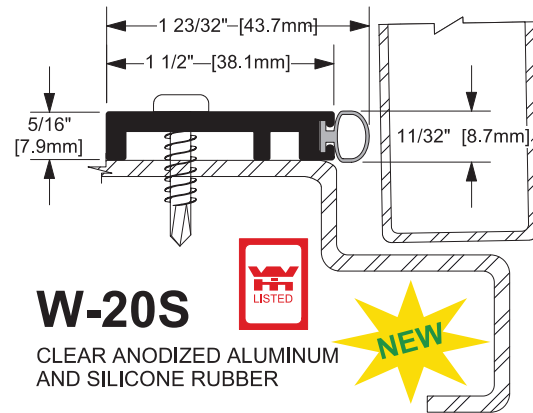
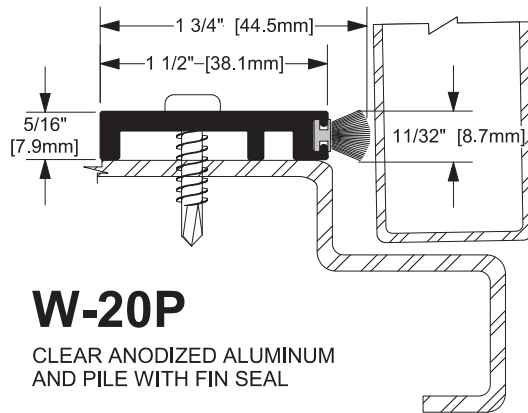
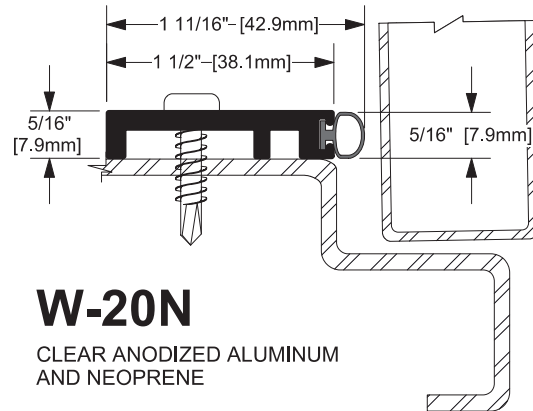
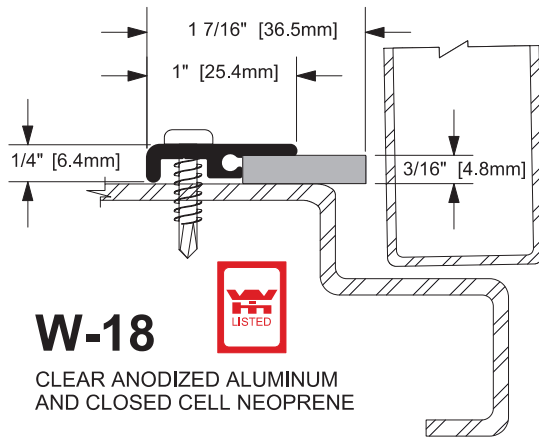
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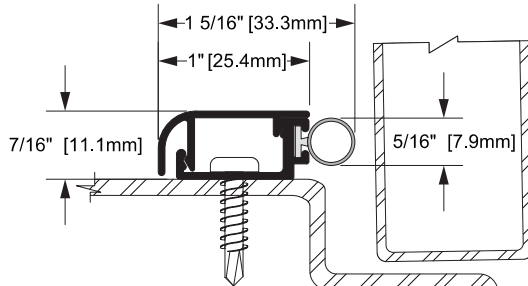
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WEATHERSTRIP

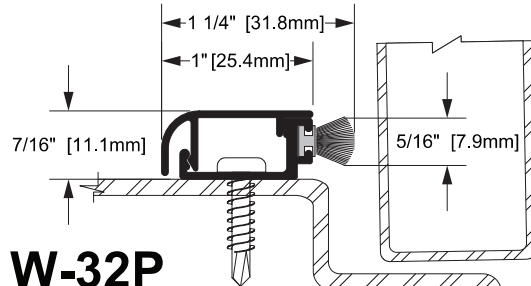


WEATHERSTRIP



W-32N

CLEAR ANODIZED ALUMINUM 2-PIECE
W/SNAP ON COVER AND NEOPRENE

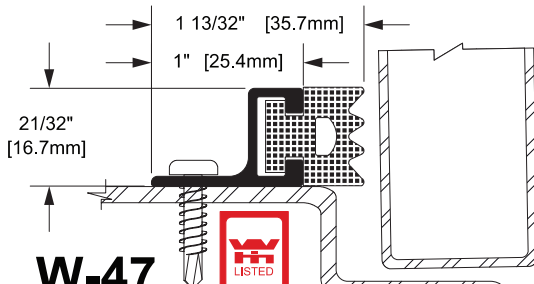


W-32P

CLEAR ANODIZED ALUMINUM 2-PIECE
W/SNAP ON COVER AND PILE WITH FIN SEAL

W-32S

CLEAR ANODIZED ALUMINUM 2-PIECE
W/SNAP ON COVER AND SILICONE

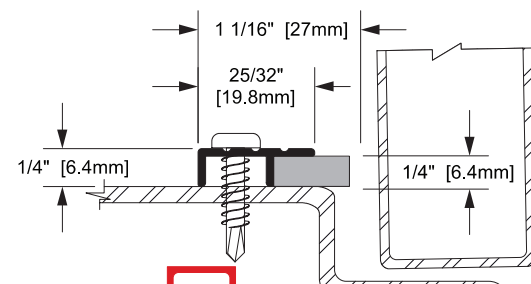


W-47

CLEAR ANODIZED ALUMINUM
AND EXTRUDED NEOPRENE

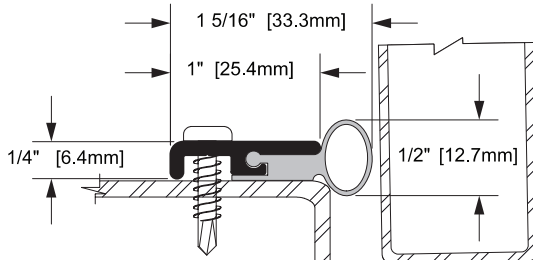
W-47S

CLEAR ANODIZED
ALUMINUM AND
SILICONE



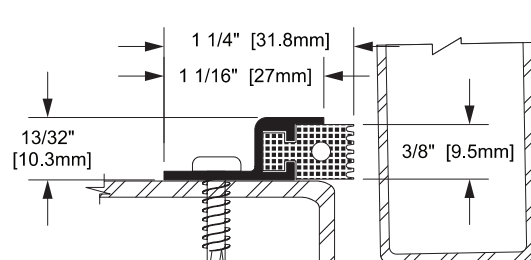
W-49

MILL FINISH ALUMINUM
AND CLOSED CELL NEOPRENE



W-50S

CLEAR ANODIZED ALUMINUM
AND SILICONE RUBBER SUITABLE
FOR -110° F (-80° C) TO +570° F (+300° C)



W-61N

CLEAR ANODIZED ALUMINUM
AND EXTRUDED NEOPRENE

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31

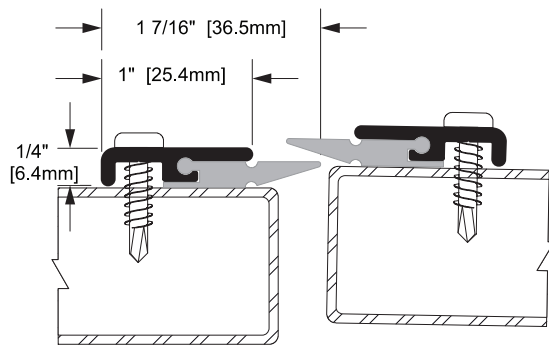
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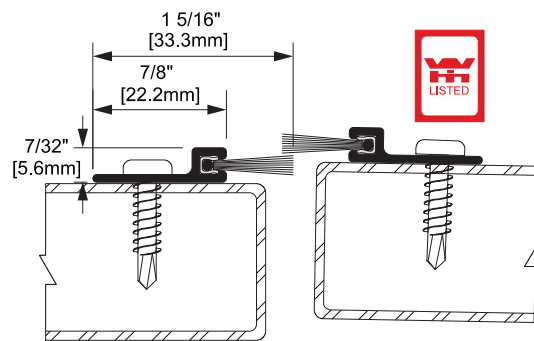
Mount Hope ES Reno 2025 HWDSB R1

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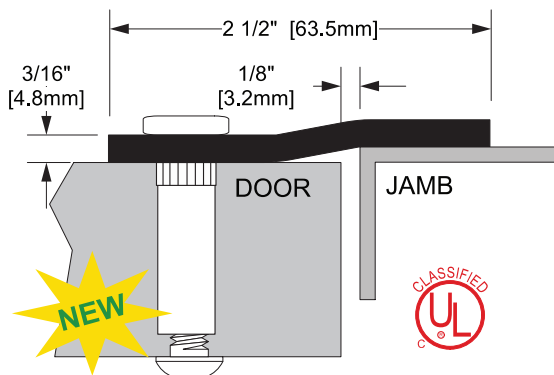
ASTRAGALS



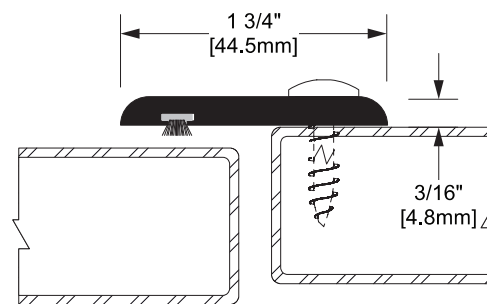
W-5 CLEAR ANODIZED ALUMINUM AND VINYL



W-25 CLEAR ANODIZED ALUMINUM AND NYLON BRUSH



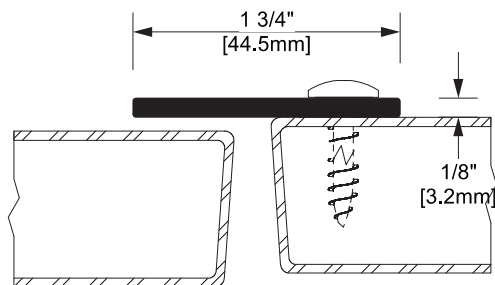
W-7 SECURITY ASTRAGAL
PRIMED C.R. STEEL c/w SECURITY SLEEVE



W-8 EXTRUDED ALUMINUM

W-8P EXTRUDED ALUMINUM WITH PILE

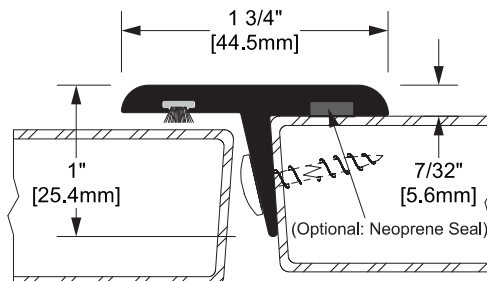
W-8SL EXTRUDED ALUMINUM WITH SILICONE



W-8S C.R. STEEL WITH CONDITIONED EDGES

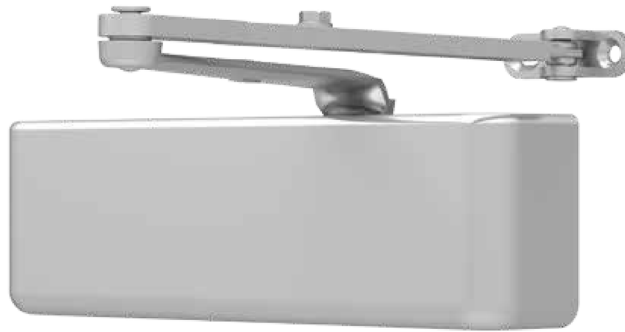
W-8SP AS ABOVE, PRIMED FINISH

W-8SS STAINLESS STEEL, SEE PG. 20



W-9 EXTRUDED ALUMINUM WITH PILE

W-9S EXTRUDED ALUMINUM WITH SILICONE



4040XP Series

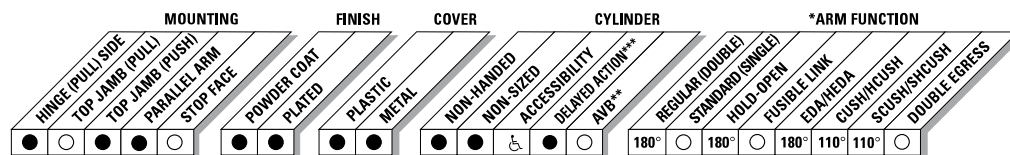
Features

The 4040XP is LCN's most durable and flexible heavy duty closer designed for institutional and other demanding high traffic applications.

Certifications	Grade 1 - ANSI A156.4, UL 10C, ADA, 100 Hour Salt Spray, Meets BAA - Buy American Act	Cover	<ul style="list-style-type: none"> ■ Plastic, Standard ■ Metal, Optional
Body Construction	<ul style="list-style-type: none"> ■ Cast Iron Body ■ Full Complement Bearings ■ 1-1/2" Diameter Piston ■ 3/4" Diameter Double Heat Treated Pinion Journal 	Fasteners	Self Reaming and Tapping Screws (SRT)
Fluid	All Weather Liquid X Fluid	Mounting	Hinge (Pull Side), Top Jamb (Push Side), Parallel Arm (Push Side)
Handing	Non-Handed	Arms	Regular Arm
Templating	Peel-n-Stick templates - 2-1/4" x 5" Mounting Hole Pattern	Finishes/Colors/ Powder Coat	<ul style="list-style-type: none"> ■ Aluminum (689) ■ Statuary Bronze (690) ■ Light Bronze (691) ■ Black (693) ■ Dark Bronze (695) ■ Brass (696) ■ Custom colors optional ■ Optional SRI primer - powder coat only ■ Optional plated finishes
Size	Adjustable Spring Size 1-6, includes Patented Green Dial		
Warranty	30 years		

Special Templates

Customized installation templates or products may be available to solve unusual applications. Contact LCN Product Support for assistance.



● AVAILABLE
○ NOT AVAILABLE

♿ Closer available with less than 5.0 lbs. opening force on 36" door.
* Maximum opening/hold-open point with standard template.
** Advanced Variable Backcheck.
*** Delay feature incorporates standard 4040 cylinder (not XP).

LCN Door Control Catalog

phone: 877-671-7011 ■ fax: 800-248-1460 ■ www.allegion.com/us ■ 009426 rev.2/16

LCN

37

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Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Arms

4040XP Series

Accessories



4040XP-3077
Regular Arm

- Non-handed
- Mounts pull side or top jamb with shallow reveal P4041 closer includes PA SHOE, 4040XP-62PA required for parallel arm mounting



4040XP-3077L
Long Arm

- Non-handed
- Includes LONG ROD AND SHOE, 4040XP-79LR for top jamb mount
- Optional



4040XP-3077ELR
Extra Long Arm

- Non-handed
- Includes EXTRA LONG ROD AND SHOE, 4040XP-79ELR for top jamb mount with deep reveal
- Optional



4040XP-3049
Hold-Open Arm

- Non-handed
- Mounts pull side or top jamb with shallow reveal, hold-open adjustable shoe
- 4040XP closer includes 4040XP-62PA shoe required for parallel arm mounting
- Optional



4040XP-3049L
Long Hold-Open Arm

- Non-handed
- Includes LONG HEAD AND TUBE, 4040XP-3048L for top jamb mount
- Optional



4040XP-3077EDA
Extra Duty Arm

- Non-handed
- Features forged, solid steel main and forearm for potentially abusive installations
- Optional



4040XP-3049EDA
Hold-Open Extra Duty Arm

- Handed
- Parallel arm features forged, solid steel main and forearm for potentially abusive installations
- Hold-open function is adjusted at the shoe
- Optional



4040XP-3077EDA/62G
Extra Duty Arm with 62G

- Non-handed
- Features forged, solid steel main and forearm for potentially abusive installations
- 62G shoe provides additional blade stop clearance
- Optional



4040XP-3049EDA/62G
Hold-Open Extra Duty Arm with 62G

- Handed
- Features forged, solid steel main and forearm for potentially abusive installations
- 62G shoe provides additional blade stop clearance. Hold-open function is adjusted at the shoe
- Optional



4040XP-3077CNS
Cush-N-Stop® Arm

- Non-handed
- Features solid forged steel main arm and forearm with stop in soffit shoe.
- Optional



4040XP-3049CNS
HCUSH Arm

- Non-handed
- Hold-open function with templated stop/hold-open points
- Handle controls hold-open function
- Optional



4040XP-3077SCNS
Spring CUSH Arm

- Non-handed
- For abusive applications features solid forged steel main arm and forearm with spring loaded stop in the soffit shoe
- Optional



4040XP-3049SCNS
Spring HCUSH Arm

- Non-handed
- For abusive applications features solid forged steel main arm and forearm with spring loaded stop in the soffit shoe
- Handle controls hold-open function
- Optional

LCN Door Control Catalog

phone: 877-671-7011 ■ fax: 800-248-1460 ■ www.allegion.com/us ■ 009426 rev.2/16

LCN®

43

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Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Conventional cylinders

Mortise cylinders for
Schlage L SeriesL and N
Escutcheons

Cylinder only



L escutcheon

Concealed
body cylinder

Sectional trim

Compression
ring and spring

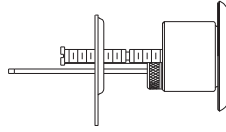
L Series mortise locksets

Design	Function	Standard pin and tumbler	SL cylinder ¹	Primus/ Primus XP	Primus XP SL cylinder ¹	Primus UL 437/ Primus XP UL 437	Primus XP lockout	Primus XP UL 437 lockout
L and N Escutcheons (cylinder and compression spring only)	All except below	30-021	91-063	20-793/ 20-793-XP	91-760-XP	20-593/ 20-593-XP	20-717 ³	20-517 ³
	L9060P outside	26-021	91-059	20-701/ 20-701-XP	91-754-XP	20-501/ 20-501-XP	20-715 ³	20-515 ³
	L9485, L9486 Faculty restroom	30-022 ²	N/A	N/A	N/A	N/A	N/A	N/A
L escutcheon with concealed body cylinder (C suffix)	All except below	30-004	N/A	20-789/ 20-789-XP	N/A	20-589/ 20-589-XP	N/A	N/A
	L9060P outside	26-023	N/A	24-767/ 24-767-XP	N/A	24-567/ 24-567-XP	N/A	N/A
	L9485, L9486 Faculty restroom	30-005 ²	N/A	N/A	N/A	N/A	N/A	N/A
Sectional trim (cylinder with compression ring & spring)	All except below	30-001	91-062	20-787/ 20-787-XP	91-757-XP	20-587/ 20-587-XP	20-715	20-517
	L9060P outside	20-001	91-051	20-700/ 20-700-XP	91-751-XP	20-500/ 20-500-XP	20-715	20-515
	L9485, L9486 Faculty restroom	30-002 ²	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

- For restricted Everest 29 R and Everest B only
- Specify door hand for faculty restroom cylinders
- Discard compression ring for Lockout cylinders with escutcheon trim

Cylinders for exit devices, aluminum door, etc.



Rim cylinders			
Number	Tailpiece	Pins	Cylinder mechanism
20-021	Vertical	6	Standard pin and tumbler
20-022	Horizontal		
91-074	Vertical	7	SL cylinder (restricted Everest 29 R and Everest B only)
91-075	Horizontal		
20-709	Vertical	6	Primus
20-710	Horizontal		
20-716	Horizontal	6	Primus lockout
20-509	Vertical	6	Primus UL 437 listed high security
20-510	Horizontal		
20-516	Horizontal	6	Primus UL 437 listed lockout
20-709-XP	Vertical	6	Primus XP
20-710-XP	Horizontal		
91-774-XP	Vertical	7	Primus XP SL cylinder (restricted Everest 29 R and Everest B only)
91-775-XP	Horizontal		
20-716-XP	Horizontal	6	Primus XP lockout
20-509-XP	Vertical	6	Primus XP UL 437 listed high security
20-510-XP	Horizontal		
20-516-XP	Horizontal	6	Primus XP UL 437 listed lockout

Notes

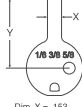
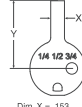

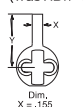

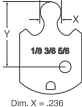
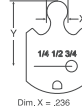

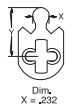

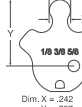
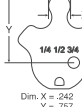

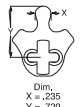

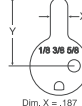
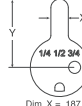
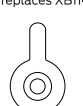
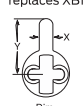

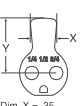
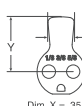
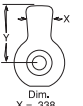
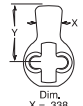
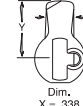
- 1 1/8" length standard. Optional lengths available in 1/8" (4mm) increments up to 1 3/4" (44mm).
- Lockout keys must be ordered separately and lockout cylinders will not be master keyed by Schlage.

Mortise and rim cylinder finish options

Bright brass (605)	Satin brass (606)	Antique brass (609)	Satin bronze (612)	Oil rubbed bronze (613)	Satin nickel (619)	Matte black (622)	Bright chrome (625)	Satin chrome (626)	Bright stainless steel (629)	Satin stainless steel (630)	Aged bronze (643e)
Faceplate	Faceplate and plug	Faceplate	Faceplate	Faceplate	Faceplate	Faceplate and plug	Faceplate	Faceplate and plug	Faceplate	Faceplate	Faceplate and plug

Cams

Cams for Schlage mortise cylinders in other manufacturers' mortise locks

	Modular cylinder		Interchangeable core	Classic conventional non-IC	Everest 29 AND Primus non-IC
CAM substitutions only allowed on these cylinder numbers: (Order example: 20-001 X B210-731 626 S123)	20-001, 20-002, 20-500, 20-501, 20-515, 20-700, 20-701, 20-715, 26-021		20-059, 20-061, 26-064, 20-763, 20-771, 26-091, 26-094, 80-302, 80-110, 80-132, 80-102	For conventional cylinders manufactured before July 2010 not available with cylinder	For Primus & Everest cylinders manufactured before July 2010 not available with cylinder
	1 1/8", 1 3/8", 1 5/8"		1 1/4", 1 1/2", 1 3/4"	N/A	N/A
Corbin Russwin® DL4000 Series (Old Corbin 420 and Russwin 1503)	B520-730  Dim. X = .153 Y = .781	B520-731  Dim. X = .153 Y = .781	B520-254 (was XB11-426) 	B520-295 (was XB11-458)  Dim. X = .155 Y = .775	B520-366 (was XB11-656) 
Corbin Russwin® ML2200 Series (Old Corbin 7000-9000 and Russwin 4000-5000) All functions except ML2255 and ML2242 inside (see straight cam)	B520-732  Dim. X = .236 Y = .731	B520-733  Dim. X = .236 Y = .731	B520-253 (was XB11-352) 	B520-233 (was XB08-899)  Dim. X = .232 Y = .729	B520-309 (was XB11-629) 
Corbin Russwin A65 ML2200 master ring deadbolt functions manufactured before 6/10/93 and old Russwin cast iron residential locks. For all Best 40H Series and 30H Deadbolt function	B520-734  Dim. X = .242 Y = .757	B520-735  Dim. X = .242 Y = .757	B520-360 (was XB11-817) 	B520-223 (was XB03-142)  Dim. X = .250 Y = .729	B520-367 (was XB11-887) 
Yale® 2160	B520-736  Dim. X = .187 Y = .727	B520-737  Dim. X = .187 Y = .727	B520-296 (was XB11-461, replaces XB11-484) 	B520-256 (was XB11-430, replaces XB10-659)  Dim. X = .186 Y = .718	B520-329 (was XB11-631, replaces XB11-630) 
Arrow® #004					
Sargent® 13-0660 All functions except 16 inside and 50 outside					
Best 30 Latch function	L583-476  Dim. X = .25 Y = .72	L583-477  Dim. X = .25 Y = .72	K510-730  Dim. X = .338 Y = .71	B502-191  Dim. X = .338 Y = .71	B502-948  Dim. X = .338 Y = .71
	Cam substitution with cylinders shown above are no charge			Not available for substitution	

The following complete cylinders are available. Specify the desired cam from the correct column above:

Other manufacturers' registered trade names are for identification and reference only.

Cylinder mechanism

Conventional cylinder
Primus XP cylinder
Primus XP UL437 Listed cylinder
Full size IC with conventional core
Full size IC with Primus XP core
Full size IC housing less core
SFIC with Everest 29 core
SFIC with keyed construction core
SFIC with disposable construction core
SFIC housing less core

Collar

compression ring and spring
compression ring and spring
compression ring and spring
compression ring, spring, 3/8" blocking ring
compression ring, spring, 3/8" blocking ring
compression ring, spring, 3/8" blocking ring
compression ring, spring, 1/4" blocking ring
compression ring, spring, 1/4" blocking ring
compression ring, spring, 1/4" blocking ring
compression ring, spring, 1/4" blocking ring

How to order

20-001 x cam number
20-700 x cam number
20-500 x cam number
20-061 x cam number
20-771 x cam number
26-094 x cam number
80-302 x cam number
80-132 x cam number
80-110 x cam number
80-102 x cam number

Schlage • Key systems • 49



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submission Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Cabinet locks with cylinder

Cabinet deadbolt locks



CL100PB

Cylinder formats:
CL100PB - Conventional format

Interchangeable Core formats:
CL777R - Full Size IC (FSIC)
CL721G - Small Format IC (SFIC)

Rekeying: Release mechanism allows Conventional cylinder replacement. Interchangeable cores replaced using control key

Certifications: ANSI 156.11 - Conventional Grade 1; FSIC and SFIC Grade 2

Body: Die cast zinc

Bolt: Steel $1\frac{5}{16}$ " projection; $\frac{3}{4}$ " SFIC

Door thickness: $\frac{7}{8}$ " to $1\frac{3}{8}$ "

Barrel diameter: $1\frac{1}{8}$ "

Finishes: Conventional and FSIC formats - 605 and 626; SFIC format - 626 only

Drawer deadbolt locks



CL771G

Cylinder formats:
CL200PB - Conventional format

Interchangeable Core formats:
CL888R - Full Size IC (FSIC)
CL771G - Small Format IC (SFIC)

Rekeying: Release mechanism allows Conventional cylinder replacement. Interchangeable cores replaced using control key

Certifications: ANSI 156.11 - Conventional Grade 1; FSIC and SFIC Grade 2

Body: Die cast zinc

Bolt: Steel $\frac{3}{4}$ " projection

Door thickness: $\frac{7}{8}$ " to $1\frac{3}{8}$ "

Barrel diameter: $1\frac{1}{8}$ "

Finishes: Conventional and FSIC formats - 605 and 626; SFIC format - 626 only

Rim deadbolt lock



CL775G

Interchangeable Core format:
CL775G - Small Format IC (SFIC)

Rekeying: Interchangeable core replaced using control key

Body: Die cast zinc cylinder housing, stamped steel back plate and steel case

Bolt: $1\frac{1}{2}$ " projection

Material thickness: up to $1\frac{1}{16}$ "

Barrel diameter: $1\frac{1}{8}$ "

Compatibility: Retrofits Best 5L Series

Finish: 626

Rim latch



CL725G

Interchangeable Core format:
CL725G - Small Format IC (SFIC)

Rekeying: Interchangeable core replaced using control key

Body: Die cast zinc cylinder housing, stamped steel back plate and steel case

Material thickness: up to $1\frac{1}{16}$ "

Barrel diameter: $1\frac{1}{8}$ "

Compatibility: Retrofits Best 5L Series

Finish: 626

Cam locks



CL920R

Interchangeable Core formats:
CL920R - Full Size IC (FSIC)
CL720G - Small Format IC (SFIC)

Rekeying: Interchangeable core replaced using control key

Body: Die cast zinc

Body diameter: $1\frac{1}{8}$ "; across flats $\frac{7}{8}$ "

Mounting cutout: $1\frac{5}{32}$ "

Material thickness: .08" to $1\frac{1}{8}$ "

Finish: 626

Ratchet locks



CL729G

Interchangeable Core formats:
CL929R - Full Size IC (FSIC)
CL729G - Small Format IC (SFIC)

Rekeying: Interchangeable core replaced using control key

Body: Die cast zinc

Body diameter: $1\frac{1}{8}$ "

Material thickness: up to $\frac{1}{4}$ "

Finish: 626

Mailbox lock



CL728G

Interchangeable Core format:
CL728G - Small Format IC (SFIC)

Rekeying: Interchangeable core replaced using control key

Body: Die cast zinc housing; steel body

Barrel length: Adjustable

Handing: RH standard

Retrofits: Best BL

Finish: 626

Keying options

Large format keying:
Conventional and FSIC cylinder formats available in standard pin and tumbler, Primus XP and Primus XP UL 437 high-security mechanisms. Everest 29 S123 keyway standard. Classic and restricted keyways also available.

Small format keying:
SFIC cylinder format available in standard pin and tumbler mechanism (A2 pinning); Everest 29 R keyway.

Available keyed alike (KA), keyed different (KD) and master keyed. FSIC and SFIC construction cores available.

Finishes

Bright brass 605 Satin chrome 626



Schlage • Portable security • 15

Introduction

Key systems

KS Series

KC Series

Cylinders

Parts

Cabinet locks

CDH

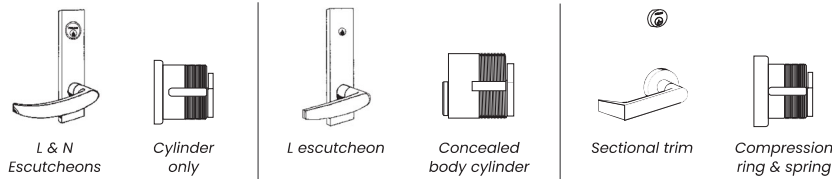
Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Conventional Cylinders

Mortise Cylinders for Schlage L Series



L Series Mortise Locksets								
Design	Function	Standard pin & tumbler	SL cylinder ¹	Legacy Primus Primus RP Primus XP	Primus XP SL cylinder ¹	UL 437 Legacy Primus Primus RP Primus XP	Primus XP lockout	Primus XP UL 437 lockout
L & N Escutcheons (cylinder only)	All except below	30-021	91-063	20-793 20-793-RP 20-793-XP	91-760-XP	20-593 20-593-RP 20-593-XP	N/A	N/A
	L9060P outside	26-021	91-059	20-701 20-701-RP 20-701-XP	91-754-XP	20-501 20-501-RP 20-501-XP	20-715-XP	20-515-XP
	L9485, L9486 Faculty restroom	30-022 ²	N/A	N/A	N/A	N/A	N/A	N/A
	LM9280, LM/LMV9380 storeroom	30-019	91-130 (1-1/8") Requires Handling	N/A	N/A	N/A	N/A	N/A
L escutcheon with concealed body cylinder	All except below	30-004	N/A	20-789 20-789-RP 20-789-XP	N/A	20-589 20-589-RP 20-589-XP	N/A	N/A
	L9060P outside	26-023	N/A	24-767 24-767-RP 24-767-XP	N/A	24-567 24-567-RP 24-567-XP	N/A	N/A
	L9485, L9486 Faculty restroom	30-005 ²	N/A	N/A	N/A	N/A	N/A	N/A
Sectional trim (cylinder with compression ring & spring)	All except below	30-001	91-062	20-787 20-787-RP 20-787-XP	91-757-XP	20-587 20-587-RP 20-587-XP	20-715-XP	20-515-XP
	L9060P outside	20-001	91-051	20-700 20-700-RP 20-700-XP	91-751-XP	20-500 20-500-RP 20-500-XP	20-715-XP	20-515-XP
	L9485, L9486 Faculty restroom	30-002 ²	N/A	N/A	N/A	N/A	N/A	N/A
	LM9280, LM/LMV9380 storeroom	30-000 ⁴	91-129 (1-1/8")	N/A	N/A	N/A	N/A	N/A

Notes:

- For restricted Everest 29 R and Everest B only.
 - Specify door hand for faculty restroom cylinders.
 - Discard compression ring for Lockout cylinders with escutcheon trim.
 - Includes the L/LV9081 Accessible Storeroom function.
- Finishes: 605, 606, 611, 612, 613, 619, 622, 625, 626, 629 and 630.
Concealed cylinders available in 606, 622, 626 and 643e only.
Plug faces available in 606, 622, 626 and 643e only.

6-pin Everest 29 S123 keyway standard for stock cylinders; S145 standard for new masterkeyed systems.
Standard cylinder lengths: sectionals (rose) trim = 1-1/8" (29 mm), escutcheon trim = 1-1/4" (32 mm).
Optional cylinder lengths are in 1/8" (4 mm) increments ranging from 1-1/8" to 1-3/4" (29 mm to 44 mm).

Commercial.Schlage.com | L Series Mortise Locks

55

Overview

Key Features

Trims & Finishes

Mechanical

Wired Electrified

Wireless Electronic

Multi-Point

Credentials & Key Systems

Parts & Options

Ordering & Specifications



Commercial Doors & Hardware Ltd.
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Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

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ND Series

Grade 1 Cylindrical Locks

Mechanical | Wired Electrified | Wireless Electronic



Commercial.Schlage.com

CDH

Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

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ND MECHANICAL**Applications**

The ND Series' functional and trim offerings are the most expansive of the Schlage cylindrical lock portfolio. This extremely versatile lock is made to handle the abuses of heavy use in any commercial setting. Options include best-in-class lock status indication ideal for classroom security and ligature-resistant options for the healthcare market.

Because ND uses an ANSI door prep common across cylindrical locks, it is ideal for both new construction and retrofit upgrades.

Key Features

- Significantly exceeds ANSI/BHMA A156.2 requirements for Grade 1 cylindrical locks
- 25 mechanical functions plus eight that feature Vandlgard® locked lever protection
- Nine lever designs, two rose designs, status indication and ligature-resistant trim options
- Nine standard finishes, plus an antimicrobial coating option
- Supports Conventional, FSIC, and SFIC cylinder formats plus high-security UL 437 options
- Multiple key systems available – open, patented, restricted, and geographically exclusive
- Support for 10 non-Schlage cores (see cylinder section)

1. NDE wireless electronic is not available in 613 finish.

ND WIRED ELECTRIFIED**Applications**

Electrified locks complement mechanical ND Series where wired electronic access control solutions are desired. They can be applied as part of a network or independently with a remote access switch such as may be used for a reception area.

Electrified ND locks are ideal for high-traffic areas where line power ensures continuous operation. They are most easily incorporated into new construction where electrified door prep, conduit hinges, and wiring is planned for the building.

Key Features

All mechanical features plus:

- Combines mechanical strength with the convenience of electronic access control
- Auto-detects 12V or 24V DC
- Selectable EL/EU operation
- Four electrified functions
- Low 0.24 amp max current draw allows multiple locks on a single power supply
- Low 0.01 amp holding current eliminates "hot levers" in electrically locked applications
- Modular Request-to-Exit (RX) can be added at any time

NDE WIRELESS ELECTRONIC**Applications**

NDE mobile enabled wireless locks are designed to affordably extend electronic access control deeper into the building beyond traditional perimeter and high security openings.

The NDE is ideal for both commercial new construction and retrofit. Facilities can benefit from the enhanced security, efficiency, and convenience of upgrading to electronic credentials.

Key Features

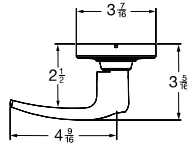
All mechanical features' plus:

- Interior push button with indication for storeroom, office, privacy and apartment functionality
- Compatible with Bluetooth, NFC, smart, or proximity credentials
- Integrated credential reader, door position sensor, and request-to-exit (RX) switch
- Built-in Bluetooth® enables wireless configuration from smart phones/tablets
- Functions in offline or No-Tour mode or as a networked lock with either periodic check-ins or real-time management
- Up to 2 years of battery life

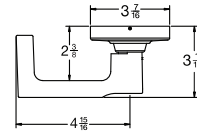
Trims & Finishes

Lever Designs & Finishes

Athens (ATH)

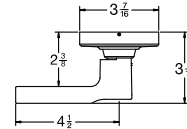


Cores KIL, FSIC, SFIC, L-CO, L-SA, J-CO6, J-ME, J-SA, J-YA6

Boardwalk (BRK)¹

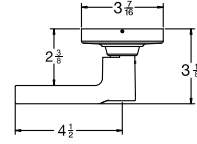
Cores KIL, FSIC, SFIC

Broadway (BRW)

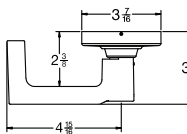


Cores KIL, FSIC, SFIC

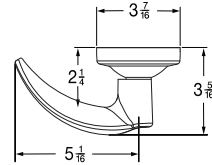
Latitude (LAT)



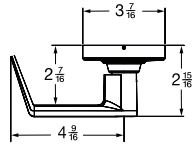
Cores KIL, FSIC, SFIC

Longitude (LON)¹

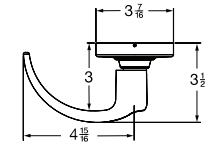
Cores KIL, FSIC, SFIC

Omega (OME)¹

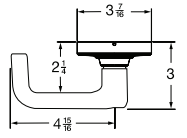
Cores KIL, FSIC, SFIC

Rhodes (RHO)¹

Cores KIL, FSIC, SFIC, L-CO, L-SA, J-CO6, J-CO7, J-ME, J-SA, J-YA6, J-YA7

Sparta (SPA)¹

Cores KIL, FSIC, SFIC, L-CO, L-SA, J-CO6, J-ME, J-SA, J-YA6

Tubular (TLR)¹

Cores KIL, FSIC, SFIC, L-CO, L-SA, J-CO6, J-ME, J-SA, J-YA6

Finishes



605
Bright Brass



606
Satin Brass



612
Satin Bronze



613²
Oil Rubbed
Bronze



619
Satin Nickel



622
Matte Black



625
Bright
Chrome



626/626AM
Satin
Chrome/
Antimicrobial



630³
Satin
Stainless
Steel



643e
Aged Bronze

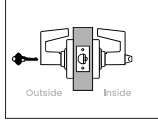
¹ Boardwalk, Longitude, Omega, Rhodes, Sparta, and Tubular levers comply with California state code for return within 1/2" of door face.

² NDE wireless electronic locks not available in 613 finish.
³ Available on HSLR trim only.

Mechanical Lock Functions

Keyed Functions

Schlage ND53



Entrance lock



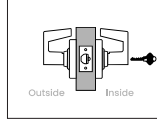
- Lever with key cylinder outside; push/turn button in lever inside; deadlatch
- In unlocked state latch is retracted by either lever
- Outside lever is made inoperative by pushing button or pushing and turning button on inside lever; key outside does not lock
- Pushed button unlocking:** key outside or rotating inside lever retracts latch and releases button unlocking outside lever
- Pushed/turned button unlocking:** key outside or rotating inside lever retracts latch but does not unlock outside lever; rotate inside button to start position to allow button release and unlocking by key or by rotating inside lever
- Inside lever always free for immediate egress

Caution: Egress without fully releasing the push/turn button can result in lock-out situations.

Note: Locks ordered with indicator trim fit 1-3/4" doors. Sold separate spacer kits allow application to doors 1-3/8" to 1-11/16".

ANSI F109

Schlage ND60 with XN12-001

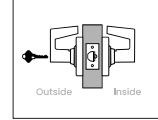


Vestibule lock with interior unlocking only

- Lever outside; lever with key cylinder inside; deadlatch
- In unlocked state latch is retracted by either lever
- Outside lever is locked or unlocked by key inside
- Inside lever always free for immediate egress

To order, specify function and note XN12-001 as a special option.

ANSI Schlage ND70



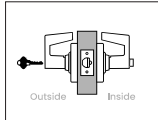
Classroom lock, exterior lockdown only



- Lever with key cylinder outside; lever inside; deadlatch
- In unlocked state latch is retracted by either lever
- Outside lever is locked or unlocked by key outside
- Inside lever always free for immediate egress

ANSI F84

Schlage ND73



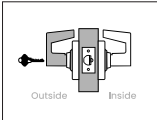
Corridor lock



- Lever with key cylinder outside; push button in lever inside; deadlatch
- In unlocked state latch is retracted by either lever
- Outside lever is made inoperative by pushing button on inside lever or by key outside
- When locked by pushed button:** rotating inside lever retracts latch and releases button unlocking outside lever; closing door also unlocks preventing lock-out
- When locked by key:** rotating inside lever retracts latch but outside lever remains fixed until unlocked by key outside
- Inside lever always free for immediate egress

ANSI F90

Schlage ND80



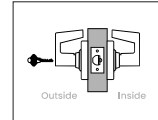
Storeroom lock



- Lever with key cylinder outside; lever inside; deadlatch
- Outside lever always fixed; latch retracted by inside lever
- Key in outside lever retracts latch only
- Inside lever always free for immediate egress

To order configured with Request to Exit (RX), specify RX under special options.

ANSI Schlage ND81



Accessible storeroom lock



- Lever with key cylinder outside; lever inside; deadlatch
- Outside lever is always fixed when key is not present; latch retracted by inside lever
- Key outside turned counter-clockwise retracts latch; 180-degree clockwise rotation of key allows outside lever to retract latch
- Inside lever always free for immediate egress

To order configured with Request to Exit (RX), specify RX under special options.

ANSI F86

Mechanical Lock Functions

Keyed, Double Cylinder Functions

Schlage ND60

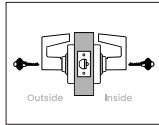
ANSI F88

Schlage ND66

ANSI F91

Schlage ND70 x 80

ANSI -



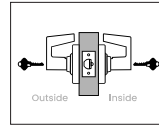
Vestibule lock



- Lever with key cylinder both sides; deadlatch
- In unlocked state latch is retracted by either lever
- Outside lever is made inoperative by key inside; key outside does not lock
- Key outside retracts latch but cannot unlock outside lever; only key inside unlocks
- Inside lever always free for immediate egress

Note: Available with optional instruction rose identifying key rotation direction for rapid lockdown, 626 finish only.

To order with instruction rose specify function and note XN12-035 as a special option.

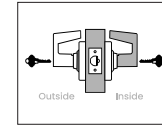


Store lock



- Lever with key cylinder both sides; deadlatch
- In unlocked state latch is retracted by either lever
- Key in either lever locks or unlocks both levers

Caution: Double cylinder locks on any door, in any structure which is used for egress are a life safety hazard in times of emergency and their use is not recommended. Installation should be in accordance with existing codes only.



Classroom by storeroom lock

- Lever with key cylinder both sides; deadlatch
- In unlocked state inside lever is always fixed; latch retracted by outside lever
- Outside lever is locked or unlocked by key outside; key inside retracts latch but does not unlock either lever

Caution: Double cylinder locks on any door, in any structure which is used for egress are a life safety hazard in times of emergency and their use is not recommended. Installation should be in accordance with existing codes only.

Schlage ND72 with XN12-002

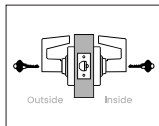
ANSI F80

Schlage ND72 with XN12-003

ANSI F80

Schlage ND78

ANSI F110

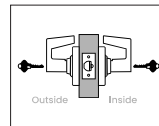


Communicating lock

- Lever with key cylinder both sides; deadlatch
- In unlocked state latch is retracted by either lever
- Key in either lever makes inoperative only that lever
- Key in either lever retracts the latch and unlocks only that lever

Caution: Double cylinder locks on any door, in any structure which is used for egress are a life safety hazard in times of emergency and their use is not recommended. Installation should be in accordance with existing codes only.

To order, specify function and note XN12-002 as a special option.

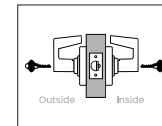


Vandlgard® communicating lock

- Lever with key cylinder both sides; deadlatch
- In unlocked state latch is retracted by either lever
- Key in either lever makes inoperative only that lever; Vandlgard® allows locked lever to rotate freely when locked
- Key in either lever retracts the latch and unlocks only that lever

Caution: Double cylinder locks on any door, in any structure which is used for egress are a life safety hazard in times of emergency and their use is not recommended. Installation should be in accordance with existing codes only.

To order, specify function and note XN12-003 as a special option.



Classroom security lock (180-degree lockdown)



- Lever with key cylinder both sides; deadlatch
- In unlocked state latch is retracted by either lever
- Outside lever is made inoperative by rotating key in either lever 180 degrees counter-clockwise and returning to start position
- Unlock outside lever by rotating key 180 degrees clockwise in either lever and returning to start position
- Inside lever always free for immediate egress

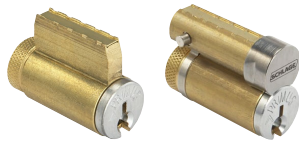
Locks ordered in 626 finish come standard with instruction rose (47342586) identifying key rotation direction for rapid lockdown. Other finishes receive a standard rose.

Note: Locks ordered with indicator trim fit 1-3/4" doors. Sold separate spacer kits allow application to doors 1-3/8" to 1-11/16".

Cylinders & Key Systems

A strong lock is only part of the security solution—proper key control is equally important. Schlage offers extensive options to meet the security needs of the specific project.

Cylinders



Conventional (KIL) & Full Size Interchangeable Core (FSIC) Cylinder Options¹

- 6-pin large format keying (standard)
- 7-pin small format keying (A2 pinning) available in SL cylinders
- 6-pin available in Schlage Classic Obverse and Everest 29 S and T keyway families plus supported legacy keyways
- Primus security upgrades offer geographic exclusivity
- Primus UL 437 listed high-security cylinders are capable of withstanding extreme physical attack

1. Everest 29 S123 keyway is the default keyway on all Schlage locks unless specified otherwise.

2. Restricted keyway cores require authorization from the end user.



Small Format Interchangeable Core (SFIC) Cylinder Options²

- 7-pin small format keying (A2 pinning)
- Available in Schlage Everest 29 R and legacy Everest B restricted keyway families²

SL Format Cylinders

- Same A2 pinning style as SFIC cylinders but in Conventional and FSIC formats
- Enables an Everest 29 R or Everest B keyway facility to gain Primus XP program security

Key Systems

Everest 29 Keyway Families

- Patented through 2029
- Available restricted keyway families provide a higher level of administrative security
- Can be integrated into an existing legacy Everest key system
- Upgradeable to Primus XP and UL 437 levels of security

Classic Obverse Keyway Family

- Open keyway – keys are duplicated and available without ordering formalities
- Upgradeable to Primus RP and UL 437 levels of security

Legacy Keyway Families

- Patent expired keyway families include legacy Everest, Quad, Numbered and Reversed
- Everest and Quad are upgradeable to Primus XP and UL 437 cylinders to regain patent and key control protection for critical points of entry



Commercial.Schlage.com | ND Series Cylindrical Locks

33

Conventional cylinders

Mortise cylinders for
Schlage L and HL Series locks

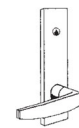
Security	Key mechanism	Pins	Patent protected keyway families	Functions	Full-face cylinders for L and N escutcheons	Concealed body cylinder for L escutcheon	Cylinders for sectional (rose) trim
Basic security	Standard pin and tumbler	6	┘	All except below	L Series 30-021	L Series 30-004	L and HL
				L9060 outside	26-021 ²	26-023	20-001 ²
	Open keyways	6	S (Everest 29)	LM9280, LM/LMV9380 storeroom	30-019	—	30-000 ⁵
Enhanced security				L9485, L9486 ⁴ faculty restroom/hotel	30-022 ³	30-005 ³	30-002 ³
	Check pin	6	T (Everest 29)	All except below	30-021	30-004	30-001
				L9060 outside	26-021 ²	26-023	20-001 ²
Restricted use				LM9280, LM/LMV9380 storeroom	30-019	—	30-000 ⁵
				L9485, L9486 ⁴ faculty restroom/hotel	30-022 ³	30-005 ³	30-002 ³
	SL	7	R (Everest 29)	All except below	91-063	—	91-062
Upgraded security				L9060 outside	91-059	—	91-051
				LM9280, LM/LMV9380 storeroom	91-130 (1 1/4")	—	91-129 (1 1/8")
	Legacy Primus	6	S, T (Everest 29)	All except below	20-793	20-789	20-787
Primus level restricted use, geographic exclusivity, and independent sidebar				L9060 outside	20-701 ²	24-767	20-700 ²
				LM9280, LM/LMV9380, L9485, L9486	—	—	—
	Primus RP	6	Obverse ¹ (Classic)	All except below	20-793-RP	20-789-RP	20-787-RP
				L9060 outside	20-701-RP ²	24-767-RP	20-700-RP ²
				LM9280, LM/LMV9380, L9485, L9486	—	—	—
	Primus XP	6	S, T (Everest 29)	All except below	20-793-XP	20-789-XP	20-787-XP
				L9060 outside	20-701-XP ²	24-767-XP	20-700-XP ²
				LM9280, LM/LMV9380, L9485, L9486	—	—	—
	Primus XP SL	7	R (Everest 29)	All except below	91-760-XP	—	91-757-XP
High security				L9060 outside	91-754-XP	—	91-751-XP
				LM9280, LM/LMV9380, L9485, L9486	—	—	—
	Legacy Primus	6	S, T (Everest 29)	All except below	20-593	20-589	20-587
All Primus benefits plus added UL 437 physical security				L9060 outside	20-501 ²	24-567	20-500 ²
				LM9280, LM/LMV9380, L9485, L9486	—	—	—
	Primus RP	6	Obverse ¹ (Classic)	All except below	20-593-RP	20-589-RP	20-587-RP
				L9060 outside	20-501-RP ²	24-567-RP	20-500-RP ²
				LM9280, LM/LMV9380, L9485, L9486	—	—	—
	Primus XP	6	S, T (Everest 29)	All except below	20-593-XP	20-589-XP	20-587-XP
				L9060 outside	20-501-XP ²	24-567-XP	20-500-XP ²
				LM9280, LM/LMV9380, L9485, L9486	—	—	—
	Primus XP SL	7	R (Everest 29)	All except below	—	—	91-557-XP
				L9060 outside	91-564-XP	—	91-751-XP
				LM9280, LM/LMV9380, L9485, L9486	—	—	—



L and N Escutcheons



Cylinder only



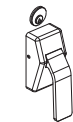
L escutcheon



Concealed body cylinder



Sectional trim



HL Series



Compression ring and spring

1. Out-of-patent keyways like Classic Obverse are available. Obverse, however, can gain patent protection in a Primus RP or XP cylinder. RP is recommended because patent coverage carries to 2029 versus 2024 for Primus XP.
2. For L9060 outside applications that may require a longer cam - use L583-941 (1 1/8, 1 3/8, 1 7/8) and L583-942 (1 1/4, 1 1/2, 1 3/4).

3. Specify handing for faculty restroom/hotel cylinders.
4. L9486 available in Sectional (Rose) trim only.
5. Includes the L/LV9081 Accessible Storeroom function.

Note: 1 1/2" length standard. Optional lengths available in 1/8" (4mm) increments up to 1 7/8" (44mm).

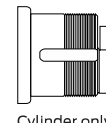
Conventional cylinders

Cylinders to use with rim, mortise exit and competitive devices

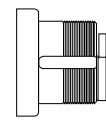
Security	Key mechanism	Pins	Patent protected keyway families	Schlage rim cylinders for exit devices			Schlage mortise cylinders for Von Duprin and other straight cam applications	
				Cylinder (horizontal tailpiece)	Cylinder (vertical tailpiece)	Lockout cylinder (horizontal tailpiece)	Cylinder with compression ring, spring and blocking ring	Cylinder with compression ring and spring
Basic security Open keyways	Standard pin and tumbler	6	— ¹	20-022	20-021	—	20-002	20-001
	Check pin	6	S (Everest 29)					
Enhanced security Restricted use	Check pin	6	T (Everest 29)	20-022	20-021	—	20-002	20-001
	SL	7	R (Everest 29)	91-075	91-074	—	91-052	91-051
Upgraded Security Primus level restricted use, geographic exclusivity, and independent sidebar	Legacy Primus	6	S, T (Everest 29)	20-710	20-709	20-716	20-703	20-700
	Primus RP	6	Obverse ¹ (Classic)	20-710-RP	20-709-RP	20-716-RP	20-703-RP	20-700-RP
	Primus XP	6	S, T (Everest 29)	20-710-XP	20-709-XP	20-716-XP	20-703-XP	20-700-XP
	Primus XP SL	7	R (Everest 29)	91-775-XP	91-774-XP	—	91-752-XP	91-751-XP
High security All Primus benefits plus added UL 437 physical security	Legacy Primus	6	S, T (Everest 29)	20-510	20-509	20-516	20-503	20-500
	Primus RP	6	Obverse ¹ (Classic)	20-510-RP	20-509-RP	20-516-RP	20-503-RP	20-500-RP
	Primus XP	6	S, T (Everest 29)	20-510-XP	20-509-XP	20-516-XP	20-503-XP	20-500-XP
	Primus XP SL	7	R (Everest 29)	91-575-XP	91-574-XP	—	91-562-XP	91-561-XP



Security	Key mechanism	Pins	Patent protected keyway families	Adams Rite ² MS, 4500 and 4700 Series; Lori 4500 Series and Corbin Russwin DL3000 Series deadlocks			Adams Rite ² 4070 deadbolt
				Cylinder only	Lockout function ³	Cylinder with 3/8" blocking ring	Cylinder only
Basic security Open Keyways	Standard pin and tumbler	6	— ¹	26-072	—	20-013	26-073
	Check pin	6	S (Everest 29)				
Enhanced security Restricted Use	Check pin	6	T (Everest 29)	26-072	—	20-013	26-073
	SL	7	R (Everest 29)	91-060	—	91-054	91-061
Upgraded security Primus level restricted use, geographic exclusivity, and independent sidebar	Legacy Primus	6	S, T (Everest 29)	—	20-718	20-706	20-708
	Primus RP	6	Obverse ¹ (Classic)	—	20-718-RP	20-706-RP	20-708-RP
	Primus XP	6	S, T (Everest 29)	—	20-718-XP	20-706-XP	20-708-XP
	Primus XP SL	7	R (Everest 29)	91-758-XP	—	91-755-XP	91-759-XP
High security All Primus benefits plus added UL 437 physical security	Legacy Primus	6	S, T (Everest 29)	—	20-518	20-506	20-508
	Primus RP	6	Obverse ¹ (Classic)	—	20-518-RP	20-506-RP	20-508-RP
	Primus XP	6	S, T (Everest 29)	—	20-518-XP	20-506-XP	20-508-XP
	Primus XP SL	7	R (Everest 29)	91-558-XP	—	91-555-XP	91-559-XP



Cylinder only



Cylinder with compression ring and spring (lockout function)

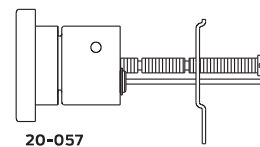
1. Out-of-patent keyways like Classic Obverse are available, Obverse, however, can gain patent protection in a Primus RP or XP cylinder, RP is recommended because patent coverage carries to 2029 versus 2024 for Primus XP.
 2. All cylinders include a set screw pack (B220-050) for Adams Rite locks.
 3. Includes cylinder, compression ring and spring. Lockout keys must be ordered separately and lockout cylinders will not be master keyed by Schlage.
- Note: 1 1/8" length standard. Optional lengths available in 1/8" (4mm) increments up to 1 3/4" (44mm).

Full size interchangeable cores

FSIC cylinders to use with rim and mortise exit devices

Security	Key mechanism	Pins	Patent protected keyway families	Rim cylinders for exit devices Core and housing	Mortise cylinders for Von Duprin and other straight cam applications	
Basic security Open keyways	Standard pin and tumbler	6	— ¹	20-057	20-061	26-091
	Check pin	6	S (Everest 29)			
Enhanced security Restricted use	Check pin	6	T (Everest 29)	20-057	20-061	26-091
	SL	7	R (Everest 29)	91-170	91-173	91-171
Upgraded security Primus level restricted use, geographic exclusivity, and independent sidebar	Legacy Primus	6	S, T (Everest 29)	20-757	20-771	20-763
	Primus RP	6	Obverse ¹ (Classic)	20-757-RP	20-771-RP	20-763-RP
	Primus XP	6	S, T (Everest 29)	20-757-XP	20-771-XP	20-763-XP
	Primus XP SL	7	R (Everest 29)	91-870-XP	91-873-XP	91-871-XP
Housing less core				20-079	26-094	26-064

1. Out-of-patent keyways like Classic Obverse are available. Obverse, however, can gain patent protection in a Primus RP or XP cylinder. RP is recommended because patent coverage carries to 2029 versus 2024 for Primus XP.



20-057

			Patent protected keyway families	Adams Rite MS, 4500 and 4700 Series, Lori 4500 Series, and Corbin Russwin DL3000 Series deadlocks/deadlatches	Adams Rite 4070 deadbolt	
Security	Key mechanism	Pins		Cylinder with compression ring, spring and 3/16" plus 3/8" blocking rings	Cylinder with compression ring and spring	Cylinder with compression ring, spring and 3/16" plus 3/8" blocking rings
Basic security Open keyways	Standard pin and tumbler	6	— ¹	20-062	26-098	20-091
	Check pin	6	S (Everest 29)			
Enhanced security Restricted use	Check pin	6	T (Everest 29)	20-062	26-098	20-091
	SL	7	R (Everest 29)	91-174	91-172	91-175
Upgraded security Primus level restricted use, geographic exclusivity, and independent sidebar	Legacy Primus	6	S, T (Everest 29)	20-766	--	20-722
	Primus RP	6	Obverse ¹ (Classic)	20-766-RP	--	20-722-RP
	Primus XP	6	S, T (Everest 29)	20-766-XP	--	20-722-XP
	Primus XP SL	7	R (Everest 29)	91-874-XP	--	91-875-XP
Housing less core				20-060 ²	--	20-090 ²

1. Out-of-patent keyways like Classic Obverse are available. Obverse, however, can gain patent protection in a Primus RP or XP cylinder. RP is recommended because patent coverage carries to 2029 versus 2024 for Primus XP.
2. Housing only - does not come with compression ring, spring, or blocking ring.



K510-711
Adams Rite
MS cam



B520-378
Adams Rite
4070 cam

Schlage • Key systems • 41

Selection guide

Classic

Everest 29

Primus

Cylinders | Cores

Competitor lock cams

Key blanks

Equipment

Ordering | Other

CDH

Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

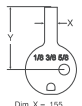
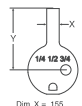

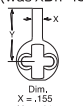
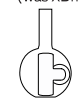
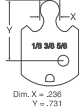
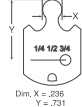

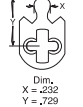

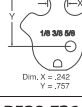


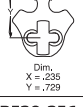

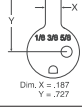
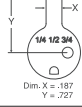

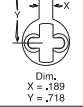
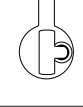
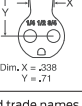
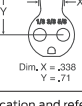
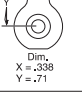
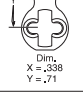
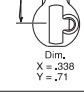
Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Cams

Cams for Schlage mortise cylinders in other manufacturers' mortise locks

Conventional (modular) mortise cylinders made after July 2010, FSIC and SFIC cylinders can be supplied with the cam substituted to fit other manufacturers' mortise locks. Substitutions are made at no additional charge. Only cylinders listed here qualify. Select cam from left half of chart below and order following this example: 20-001 x B520-731 626 S123.

Conventional modular	Standard	Primus	Primus UL 437
Cylinder with compression spring	26-021	20-701	20-501
Cylinder with compression ring and spring	20-001	20-700	20-500
Cylinder with compression ring, spring and 1/8" blocking ring	20-002	—	—
Lockout function - cylinder only	—	20-715	20-515
Full Size Interchangeable Core (FSIC)	Standard	Primus	
Less core - housing only	20-059	—	
Less core - housing with compression ring and spring	26-064	—	
Less core - housing with compression ring, spring and 3/8" blocking ring	26-094	—	
Core with housing, compression ring and spring	26-091	20-763	
Core with housing, compression ring, spring and 3/8" blocking ring	20-061	20-771	
Small Format Interchangeable Core (SFIC)	Standard	Keyed construction	Disposable construction
Less core - housing with compression ring, spring and 1/4" blocking ring	80-102	—	—
Core with housing, compression ring, spring and 1/4" blocking ring	80-302	80-132	80-110

	For conventional (modular) cylinders made after July 2010 and all interchangeable core (FSIC and SFIC) cylinders Cam substitutions allowed only on above listed cylinders			For conventional (non-IC) cylinders manufactured before August 2010 Order separately, not available with cylinder	
	Modular cylinders 1 1/8", 1 3/8", 1 5/8"	FSIC and SFIC 1 1/4", 1 1/2", 1 3/4"		Classic keyways	Everest keyways and Primus
Corbin Russwin® DL4000 Series (Old Corbin 420 and Russwin 1503)	B520-730  Dim. X = .155 Y = .761	B520-731  Dim. X = .155 Y = .761	B520-254 (was XB11-426)  Dim. X = .155 Y = .761	B520-295 (was XB11-458)  Dim. X = .155 Y = .761	B520-366 (was XB11-656) 
Corbin Russwin® ML2200 Series (Old Corbin 7000-9000 and Russwin 4000-5000) All functions except ML2255 and ML2242 inside (see straight cam)	B520-732  Dim. X = .236 Y = .731	B520-733  Dim. X = .236 Y = .731	B520-253 (was XB11-352)  Dim. X = .232 Y = .727	B520-233 (was XB08-899)  Dim. X = .232 Y = .729	B520-309 (was XB11-629) 
Corbin Russwin A65 ML2200 master ring deadbolt functions manufactured before 6/10/93 and old Russwin cast iron residential locks. For all Best 40H Series and 30H Deadbolt function	B520-734  Dim. X = .242 Y = .737	B520-735  Dim. X = .242 Y = .737	B520-360 (was XB11-817)  Dim. X = .235 Y = .752	B520-223 (was XB03-142)  Dim. X = .235 Y = .729	B520-367 (was XB11-887) 
Yale® 2160 Arrow® #004 Sargent® 13-0660 All functions except 16 inside and 50 outside	B520-736  Dim. X = .187 Y = .727	B520-737  Dim. X = .187 Y = .727	B520-296 (was XB11-461, replaces XB11-484)  Dim. X = .186 Y = .725	B520-256 (was XB11-430, replaces XB10-659)  Dim. X = .189 Y = .718	B520-329 (was XB11-631, replaces XB11-630) 
Best 30H Latch functions only	L583-476  Dim. X = .338 Y = .71	L583-477  Dim. X = .338 Y = .71	K510-730  Dim. X = .338 Y = .71	B502-191  Dim. X = .338 Y = .71	B502-948  Dim. X = .338 Y = .71

Note: Other manufacturers' registered trade names are for identification and reference only.

Schlage • Key systems • 45



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submission Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

SCHLAGE

Door position switches

Overview

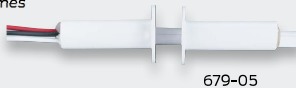
Door position switches are used to detect the open or closed status of an opening and then send this status to a control panel. They come in a variety of shapes and sizes and are designed for monitoring door positions, roof hatches, gates etc.



Overhead door, floor mount magnetic switch

Concealed SPDT magnetic switches

- For wood doors and frames
- 0.3 Amps @ 30 VDC
- UL10C/CAN-ULC-S104



679-05

Concealed/flush mount magnetic switches

- For aluminum, wood and hollow metal doors
- 0.25 Amps @ 30 VDC
- UL10C/CAN-ULC-S104



7764

- For hollow metal doors and frames
- 0.3 Amps @ 30 VDC
- UL10C/CAN-ULC-S104



679-05HM

Surface mount magnetic switches

- For aluminum, wood and hollow metal doors
- 0.25 Amps @ 30 VDC
- UL10C/CAN-ULC-S104



7766

- For wood doors and metal frames
- 0.3 Amps @ 30 VDC
- UL10C/CAN-ULC-S104



679-05WD

CDH

Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

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Ordering information

- **674-OH** - Overhead door floor mount
- **679-05** - Wood door and frame
- **679-05HM** - Hollow metal door and frame
- **679-05WD** - Wood door and metal frame
- **7764** - Concealed/flush mount
- **7766** - Surface mount

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About Allegion

Allegion (NYSE: ALLE) is a global pioneer in seamless access, with leading brands like CISA®, Interflex®, LCN®, Schlage®, SimonsVoss® and Von Duprin®. Focusing on security around the door and adjacent areas, Allegion secures people and assets with a range of solutions for homes, businesses, schools and institutions. Allegion had \$2.9 billion in revenue in 2019 and sells products in almost 130 countries. For more, visit www.allegion.com

KRYPTONITE ■ LCN ■  ■ STEELCRAFT ■ VON DUPRIN



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CDH

Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

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Device types

98/99 Rim exit device



98 and 99 rim exit devices for all types of single and double doors with mullion, UL listed for panic exit hardware. Devices are certified to ANSI/BHMA A156.3 2014, Grade 1. The 98 device has a smooth mechanism case and the 99 device has a grooved case. The rim device is non-handed except when the following device options are used: SD (special dogging), -2 (double cylinder) or SS (signal switch). Covers stock hollow metal doors with 86 or 161 cutouts on single doors (may cover cutouts on pairs – consult template).

Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device	
Device lengths	3'	2'4" to 3' (711mm to 914mm) Door size
	4'	2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 ¹³ / ₁₆ "	(1011mm)
	39 ¹¹ / ₁₆ "	(1008mm) with mullion
Center case	8" x 2 ³ / ₄ " x 2 ³ / ₈ " (203mm x 70mm x 60mm)	
Mechanism case	2 ¹ / ₄ " x 2 ¹ / ₄ " (57mm x 57mm)	
Projection	Pushbar neutral – 3 ¹³ / ₁₆ " (97mm)	
	Pushbar depressed – 3 ¹ / ₁₆ " (78mm)	
Latch bolt	Deadlocking, ³ / ₄ " (19mm) throw	
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)	
Fasteners and sex bolts (SNB)	Includes screw pack for 1 ³ / ₄ " (44mm) and 2 ¹ / ₄ " (57mm) thick metal or wood doors (Optional 425 SNB available, see page 64 for quantities)	

Accessories



299 Strike
Ships standard,
optional strikes available.



Hex key dogging
Comes standard on
98/99 rim exit devices.

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
E	Electric locking and unlocking trim
EL	Electric latch retraction
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
AX	Accessible device
GBK	Glass bead kit
PN	Pneumatic latch retraction
QM	Quiet mechanical
SNB	Sex bolts
SEC	Security screws
WH	Weep holes
XP	Extra protection

Dogging feature

Hex key dogging standard

Dogging options

CD	Cylinder dogging
CD-CX	Chexit cylinder dogging
CDSI	Cylinder dogging with security indicator
HDSI	Hex dogging with security indicator
SD	Special center case dogging
LD	Less dogging
DI	Dogging indicator
CI	Cylinder dogging indicator

Strikes

299 – Dull black

Device types

98-F/99-F Rim exit device



98-F and 99-F Rim fire exit devices are certified to ANSI/BHMA A156.3 2014, Grade 1 and UL listed for fire exit hardware. See page 67 for detailed information on UL fire exit hardware label and door opening size information. The 98-F device has a smooth mechanism case and the 99-F device has a grooved case. The rim device is non-handed except when the following device options are used: -2 (double cylinder) or SS (signal switch).

Specifications

Device functions	Device ships EO/DT/N; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	3' 2 1/4' to 3' (711mm to 914mm) Door size 4' 2 10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 13/16" (1011mm) 39 11/16" (1008mm) with mullion
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking, 3/4" (19mm) throw
Finishes	605, 606, 612, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) and 2 1/4" (57mm) thick metal or wood doors; Optional 425 SNB available for metal doors; 425 and 825 SNB required on wood doors without SLM blocking (See page 64 for quantities)

Accessories



299F Strike
Ships standard, optional
strikes available



499F Strike
With 9854/9954 mullion

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
E	Electric locking and unlocking trim
EL	Electric latch retraction
ESL	Emergency secure lockdown
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Alliegion Connect

Mechanical options

-2	Double cylinder
-2SI	Double cylinder with security indicator
AX	Accessible device
GBK	Glass bead kit
PN	Pneumatic latch retraction
QM	Quiet mechanical
SNB	Sex bolts
SEC	Security screws
SLM	Special laminate material blocking
WH	Weep holes
XP	Extra protection

Dogging option

No mechanical dogging;
QEL options available

Strikes

299F – Dull black, 499F with mullions

Introduction

How to order

Device
types

Trim
options

Mechanical
options

Electrified
options

Accessories

Additional
information

7 • Von Duprin • 98/99 Series



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Trim options

996 trim



Trim description

Nomenclature	996EO	996L*	996L-NL*	996L-BE*	996L-DT
Trim function	Exit only plate	Lever	Lever-night latch	Lever-blank escutcheon	Lever-dummy trim
Function description	Exit only plate	Key locks and unlocks	Key retracts latch bolt	Always operable, no cylinder	Pull when dogged
ANSI function	01	08	03	14	02

Device compatibility

98/99 Rim/Rim-F	■	■	■	■	■
XP98/XP99 Rim/Rim-F	■	■	■	■	■
98/9927/27-F	■	■	■	■	■
98/9947/47-F	■	■	■	■	■
98/9947WDC/WDC-F	■	■	■	■	■
98/9948/48-F	■	■	■	■	■
98/9949/49-F	■	■	■	■	■
98/9950WDC/50WDC-F	■	■	■	■	■
98/9952†	†	†	†	†	†
98/9957/57-F	■	■	■	■	■
98/9975/75-F	■	■	■	■	■

Dimensions

Escutcheon plate size	— 2 3/4" x 10 3/4" x 27/32" (70 x 273 x 21mm) —				
Pull center to center	—	—	—	—	—
Projection	—	2 7/8" (73mm)	2 7/8" (73mm)	2 7/8" (73mm)	2 7/8" (73mm)

Handing

—	Handed/reversible	Handed/reversible	Handed/reversible	Handed/reversible
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Cylinder type

Rim or vertical device	—	Rim	Rim	—	—
Mortise lock device	—	1 1/4" mortise	1 1/4" mortise	—	—

* Specify R/V if used for rim and vertical devices, M for mortise device. Example, 996L-R/V or 996L-M.

† Default trim is 252L /L-BE. Must be ordered as EO when paired with other trims (ordered separately).

Mullions

Mullions

Removable steel mullions Mullions provide single door performance in double door openings with rim devices. Mullions are easily removed by loosening bottom set screw and removing top fitting cover. The top mullion fitting is attached to the frame and is concealed by the fitting cover.

Steel mullions are 2" (51mm) wide and 3" (76mm) deep, with a wall thickness of $\frac{1}{8}$ " (3mm).

Mullions are shipped with mounting screws and prepared for strikes. Strikes are not included except where indicated.

Steel mullions are available in SP28 and SP313 finishes. Consult factory for other powder coat finish options.

KR – Keyed removable steel mullions make removal faster and easier by a single operation of the mortise cylinder. Once mullion is removed, large equipment or furniture can freely pass through the opening. The unit will self lock when re-installed, without use of the cylinder key. Uses a $1\frac{1}{4}$ " mortise cylinder with a straight cam (Schlage cam reference L583-477). Cylinders are sold separately. Prefix mullion model with "KR".

Removable aluminum mullions are $1\frac{1}{16}$ " (27mm) wide on face closest to the door and $2\frac{1}{8}$ " (60mm) at the widest point. The depth is $3\frac{1}{8}$ " (79mm) with a wall thickness of $\frac{1}{8}$ " (3mm).

Aluminum mullions are available in 606, 612, 628, 710 and 622/711 finishes. Consult factory for other powder coat finish options.

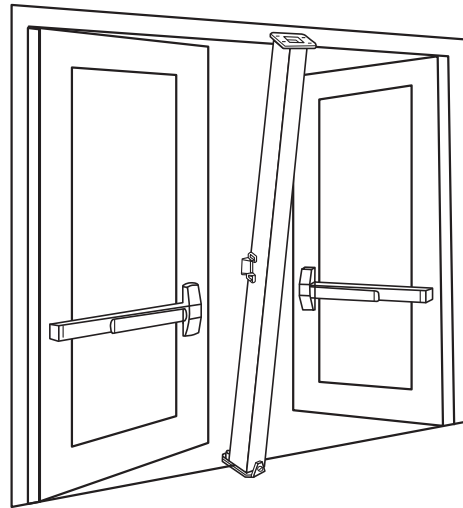
Stock Hollow Metal Applications for devices mounted to cover ANSI 161 cutouts are higher than the standard mullion strike location. Consult the factory for special strike preparation or order a blank mullion. See below.

Blank Mullions are furnished without strike preparation. They are used to mount devices at a strike height different from the standard mullion preparation.

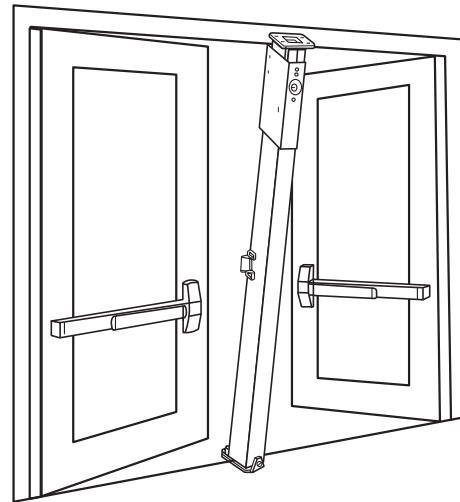
To order, specify:

1. For keyed removable option on steel mullions, prefix model number with "KR"
2. Model number.
3. Height of opening
4. Finish
5. Handing if required.
6. Centerline deviation (refer to device template for standard centerline).
7. Strikes, when required, should be ordered with device.

Removable mullions



Keyed removable steel mullions



237 & 237L Two Point Latch

Mullions

Steel mullions

1654 Prepared for two 1606 strikes. **If 1606 strikes are not specified on the order, two per mullion will be added. Additional charges apply.**

4954 Prepared for 264 or 299 strikes. For use with all Von Duprin Panic rim devices. **Note: specify strike choice with device.**

9954 Prepared for and must be used with two 268 strikes (88-F device), or two 499F (22-F, 33/35, 98-F, 99F devices). UL fire labeled mullion for up to 3 hour opening using Von Duprin fire exit rim devices. This mullion is not easily removed due to special fittings.

22-F and 88-F devices are rated up to 8' x 8" (2438mm x 2438mm).

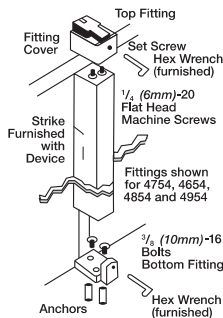
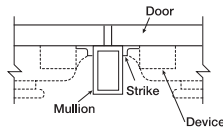
33A-F and 35A-F devices are rated up to 10'0" (3048 mm).

98-F and 99-F devices are rated up to 10'0" (3048mm).

9954-XP Prepared for two 954 strikes, for XP device.

HH9954 Heavy-duty mullion for use in impact-rated hurricane assembly.

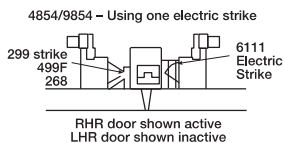
Note: If 268 or 499F strikes are not specified on the order, two per mullion will be added. Additional charges apply.



4754 Prepared for two 4263 monitor strikes.

4854 Prepared for one 299 and one 6111 electric strike. Indicate handing for electric strike.

9854 Prepared for one 268 or 499F strike and one 6111 electric strike. Indicate handing for electric strike. UL fire labelled mullion for up to 3 hour openings up to 8' x 8' (2438mm x 2438mm) using Von Duprin Fire Exit Rim Devices



Aluminum mullions

5654 Prepared for two 264 or 299 strikes. Includes one set of 154 stabilizers.

5654-XP Prepared for two 909 strikes, for XP device.

5754 Prepared and furnished with one 1408 double door strike. Includes one 154 stabilizer set. Note: specify devices "less strike".

Note: All furnished with weatherstrip edging.

Sizes for mullions

1654, 4954, 4754, 4854, 5654, 5754 9854, 9954

7' 2" (2184mm)

7' 3" (2210mm)

*8' 2" (2489mm)

8' 3" (2475mm)

*10' 2" (3099mm)

10' 3" (3124mm)

KR1654, KR4954, KR4754, KR4854 KR9854, KR9954*****

7' 6" (2286mm)

7' 5" (2261mm)

8' 6" (2591mm)

*8' 5" (2565mm)

10' 6" (3200mm)

*10' 5" (3175mm)

* Only qualifying applications will be provided with UL Label.

** Fire rated same as 9854

*** Fire rated same as 9954

Angle plate is used with narrow transom frames. The plate attaches to the transom extending the surface area needed to mount the mullion. Must be ordered separately. Specify finish.



154 Stabilizer is a two-piece interlocking set. One piece mounts on the mullion with the top mounting hole 5 3/16" (148mm) below the centerline of the strike; the other piece mounts on the door. Shims are provided to adjust for misalignment between the door and mullion.

The set maintains integrity between the door and mullion to prevent vandalism and to ensure contact between the device and strike as the doors expand and contract with temperature changes.

Furnished standard on aluminum mullions; optional for steel mullions.

MT54 Storage kit is a set of floor and wall brackets that provide convenient storage of the keyed removable mullion when removed from the opening.

To order, specify

1. Model MT54.

2. Finish SP28, SP313, or SPBLK



6200 Series strikes for mortise or cylindrical devices

Overview

Von Duprin electric strikes are known for their reliability, durability and security. The 6200 Series is designed to withstand abuse. Its heavy-duty stainless steel construction is fully UL1034 and UL10C listed.

6200 Series electric strikes are designed for use with a variety of mortise or cylindrical locksets. It interfaces with the latch mechanism of the exit device. The 6200 Series movable lip (keeper) allows a door to open, even when the latch bolt is extended. This feature, called remote release provides added benefits such as increased convenience and efficiency. The 6200 Series also provides added security and traffic control.

6200 Series electric strikes can be used for retrofit applications or new construction. To assure the proper selection of an electric strike on new applications, lockset compatibility charts are shown below. When using a lockset not listed or when retrofitting a strike to an existing application, please contact Von Duprin Technical Support for application assistance.

Features and benefits

- Non handed design provides greater flexibility
- Strike box is adjustable to compensate for misalignment of the door or frame
- Two piece plug connectors are furnished for ease of installation and for removal during strike servicing
- UL1034 Burglary-Resistant and UL10C Electric Strike for Fire Door
- Six finishes available to suite with existing hardware
- Durable stainless steel construction
- 24 VDC standard with 12 VDC and AC operation optional

6200 Series power requirements

Models	Voltage	Current	Duty	Amps	Ohms
All	12V	DC	Continuous	0.60	21
All	16V	DC	Continuous	0.40	38
All	24V	DC	Continuous	0.33	83
All	28V	DC	Continuous	0.25	111

Continuous duty = Energized 1 minute or more

Cylindrical lockset compatibility^{1,2,3}

6211, 6211AL, 6211WF, 6212, 6213, 6214, 6215, 6221, 6222, 6223, 6224, 6224AL, 6225 and 6226 Strikes

Manufacturer	Cylindrical latchbolt projection
Baldwin	$\frac{1}{2}" - \frac{3}{4}"$ (13mm – 19mm)
Best	$\frac{3}{8}" - \frac{3}{4}"$ (10mm – 19mm)
Corbin	$\frac{1}{2}" - \frac{3}{4}"$ (13mm – 19mm)
Falcon	$\frac{1}{2}" - \frac{3}{4}"$ (13mm – 19mm)
Russwin	$\frac{1}{2}" - \frac{3}{4}"$ (13mm – 19mm)
Sargent	$\frac{1}{2}" - \frac{3}{4}"$ (13mm – 19mm)
Schlage	$\frac{3}{8}" - \frac{3}{4}"$ (10mm – 19mm)
Yale	$\frac{1}{2}" - \frac{3}{4}"$ (13mm – 19mm)



Mortise lockset compatibility^{1,2,3}

6211, 6211AL, 6211WF, 6212, 6213, 6214, 6215, 6221, 6222, 6223, 6224, 6224AL, 6225 and 6226 Strikes

Manufacturer	Model number
Von Duprin	7500
Adams Rite	4510, 4710
Baldwin	6000
Best	24H, 30H
Corbin	9000
Falcon	M2300, M2500, M2600, M3300, M3500, M3600
Precision	Mortise
Russwin	Mortise
Sargent	7700, 8100, 9000
Schlage	L9000, K30, K40, K50, K60
Yale	7030, 7130, 8600, 8700

Mortise lockset compatibility^{1,3}

6210

Manufacturer	Model number
Von Duprin	7500
Best	30H (not 45H/47H)
Corbin/Russwin	ML2200, 5000, 9000, CR2200 (not 2000)
Falcon	M100, M200, M300, M400, M500, M600
Sargent	7700, 8100 (not 7800/8200)
Schlage	L9000
Yale	8700 (not 8800)

1. Von Duprin cannot guarantee compatibility as other manufacturer's designs may change without notice.
2. Signalling may not function when using 3/8" (10mm) throw bolt. Deadlocking cannot be guaranteed with all locks.
3. When using a lockset not listed or when retrofitting a strike to an existing application, please contact Von Duprin Technical Support for assistance.

6300 Series surface mounted strike for rim exit devices

Overview

Von Duprin electric strikes are known for their reliability, durability and security. The 6300 Series is designed to withstand abuse. Its heavy-duty stainless steel construction is fully UL1034 and UL10C Listed.

6300 Series electric strikes are designed for use with a variety of rim devices. It interfaces with the latch mechanism of the exit device. The movable lip (keeper) allows a door to open even when the latch bolt is extended. This feature, called remote release, provides added benefits such as increased convenience and efficiency. The 6300 Series also provides added security and traffic control.

6300 Series electric strikes are ideal for aftermarket applications. It is easy to install without modifying or altering the door frame. To assure the proper selection of an electric strike on new applications, lockset compatibility charts are shown on the next page. When using a lockset not listed or when retrofitting a strike to an existing application, please contact Von Duprin technical support for application assistance.

The 6300 is fail-secure (FSE) only to achieve compliance with UL10C for fire-rated openings. In a fail-secure application, the door is normally locked. To unlock the door, power must be applied. The 6300 strike can be used with either 12VDC or 24VDC. There are 2 connectors that ship with it and the appropriate connector for either 12VDC or 24VDC will be used, based upon the available voltage at the opening.

Features and benefits

- Non-handed design provides greater flexibility
- Requires no alteration or cutting to existing frame
- UL1034 burglary-resistant and
- UL10C electric strike for fire door
- Stainless steel (satin) finish
- Durable stainless steel construction
- Field selectable voltage 12VDC or 24VDC
- Dynamic strength 70 ft-lbs
- Endurance 2,000,000 cycles

6300 Series power requirements

Model	Voltage	Current	Duty	Amps	Ohms
6300	12V	DC	Continuous	0.50	22
6300	24V	DC	Continuous	0.24	89



Rim exit device compatibility 6300 strikes

Manufacturer	Model Number
Von Duprin	VD 22/22-F Rim
Von Duprin	VD 33A/35A Rim*
Von Duprin	VD 55 Rim
Von Duprin	VD 88 Rim
Von Duprin	VD 98/99 and 98/99-F Rim
Falcon	Falcon 24/24-F Rim*
Falcon	Falcon 25/25-F Rim
Falcon	Falcon 19/19-F Rim
Falcon Doromatic	Falcon Doromatic 1590*
Falcon Doromatic	Falcon Doromatic 1790*
Falcon Doromatic	Falcon Doromatic 2090*

* Style and frame condition may affect compatibility.

Model specifications

Model number	6300
Retrofits model	N/A
Latchbolt throw	3/4"
Face plate length	9"
Projection	3/4"
Lockset	Rim exit device
Number of doors	Single or pair with mullion
Door/frame type	Hollow metal, aluminum and wood
EB (entry buzzer)	Optional
Certifications	UL1034, UL10C, UL 294, CSFM
Application notes	Surface mounted electric strike ideal for aftermarket applications. Strike designed for use with Von Duprin 98/99, however it can be used with most rim exit devices.

6300 Series surface mounted strike for rim exit devices

Von Duprin Door control and security hardware • 17



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VON DUPRIN®

33A/35A Series

Exit devices



CDH

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2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

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Device types

33A/35A Rim exit device



33A and 35A for all types of single and double doors with mullion, UL listed for panic exit hardware. Devices are ANSI A156.3 – 2014 Grade 1. The 35A has a smooth mechanism case and the 33A has grooved case. The rim device is non-handed except when the SS (signal switch) option is used.

33A/35A fits door stiles as narrow as 1 1/8" (44mm). Newly designed device has a one piece center case cover.

Specifications

Device lengths	3'	2'4" to 3' (711mm to 914mm) Door size
	4'	2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 13/16"	(1011mm)
Center case	39 11/16"	(1008mm) with mullion
Mechanism case	8 3/16" x 1 9/16" x 2 13/32"	(208mm x 40mm x 62mm)
Projection	2 1/4" x 2 1/4"	(57mm x 57mm)
Latch bolt	Pushbar neutral – 3 13/16" (97mm)	
	Pushbar depressed – 3 1/16" (78mm)	
Fasteners and sex bolts (SNB)	Deadlocking, 3/4" (19mm) throw	
Finishes	605, 606, 612, 619 (35A only), 625, 626, 626AM, 628, 710, 711	
Includes screw pack for 1 3/4" (44mm) and 2 1/4" (57mm) wood and metal doors	#425 SNB furnished standard for end case	
	#325 SNB furnished standard for EO (exit only device)	

Accessories



1439 roller
Ships standard, optional strikes available



299 strike
Needs to be specified for hollow metal frames



Hex key dogging
Comes standard on 33A/35A rim exit devices

Features and options

Electrified options

ALK	Alarm exit kit
CX	Chexit delayed exit
ESL	Emergency secure lockdown
LX	Latch bolt monitor switch
LX-RX	Request to exit / latch bolt monitoring
QEL	Quiet electric latch retraction
RX	Request to exit, WP-RX waterproof option
RX-LC, LX-LC, LX-RX-LC	Low current option for RX, LX, LX-RX
SS	Signal switch
CON	Allegion Connect

Mechanical options

AX	Accessible device
GBK	Glass bead kit
PN	Pneumatic
QM	Quiet mechanical
SEC	Security screws
SG	Safety glow
SNB	Sex bolts
WH	Weep holes

Dogging feature

Hex key dogging standard

Dogging options

CD	Cylinder dogging
CDSI	Cylinder dogging with security indicator
HDSI	Hex dogging with security indicator
LD	Less dogging

Strikes

1439 Dull black

Optional strikes

Trim options

No trim, 386 and 388 trim



Trim description	No trim	386 trim	386NL	388 trim
Nomenclature	EO	386DT	386NL	388
Trim function	No outside trim	Dummy trim	Night latch	Night latch
Function description	Exit only	Pull when dogged	Key retracts latch bolt	Key retracts latch bolt optional pull required
ANSI function	01	02	03	03
Device compatibility				
33/35A rim	■	■	■	■
33/35 A Rim-F	■		■	■
33/3527A	■	■	■	■
33/3527A-F	■		■	■
33/3547A	■	■	■	■
33/3547A-F	■		■	■
33/3548A	■	■	■	■
33/3548A-F	■		■	■
33/3549A	■	■		
33/3549A-F	■			
33/3550A	■	■		
33/3550A-F	■			
Handing				
	—	—	Handed	—
Cylinder type				
Rim or vertical device	—	—	Rim	Rim
Mortise lock device	—	—	—	—

19 • Von Duprin • 33A/35A Series

Introduction

How to order

Device types

Trim options

Mechanical options

Electrified options

Accessories

Additional information



Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

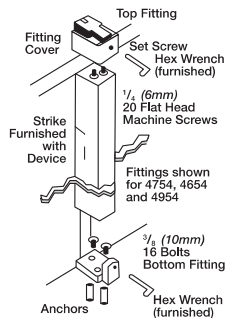
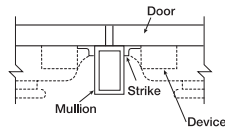
Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

Mullions

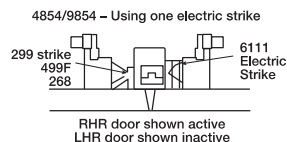
Steel mullions

- 1654** Prepared for two 1606 strikes. If 1606 strikes are not specified on the order, two per mullion will be added. Additional charges apply.
- 4954** Prepared for 264 or 299 strikes. For use with all Von Duprin Panic rim devices. **Note:** Specify strike choice with device.
- 9954** Prepared for and must be used with two 268 strikes (88-F device), or two 499F (22-F, 98-F, 99F devices). UL fire labeled mullion for up to 3 hour opening using Von Duprin fire exit rim devices. This mullion is not easily removed due to special fittings.
- 22-F and 88-F devices are rated up to 8' x 8" (2438mm x 2438mm).
- 98-F and 99-F devices are rated up to 10'0" (3048mm).

Note: If 268 or 499F strikes are not specified on the order, two per mullion will be added. Additional charges apply.



- 4754** Prepared for two 4263 monitor strikes.
- 4854** Prepared for one 299 and one 6111 electric strike. Indicate handing for electric strike.
- 9854** Prepared for one 268 or 499F strike and one 6111 electric strike. Indicate handing for electric strike. UL fire labelled mullion for up to 3 hour openings up to 8' x 8' (2438mm x 2438mm) using Von Duprin Fire Exit Rim Devices.



Aluminum mullions

- 5654** Prepared for two 264 or 299 strikes with weatherstripping. Includes one set of 154 stabilizers.
- 5754** Prepared and furnished with one 1408 double door strike. Includes one 154 stabilizer set. **Note:** specify device "less strike".

Sizes for mullions

1654, 4954, 4754, 4854, 5654	9854, 9954
7' 2" (2184mm)	7' 3" (2210mm)
*8' 2" (2489mm)	8' 3" (2475mm)
*10' 2" (3099mm)	10' 3" (3124mm)
KR1654, KR4954, KR4754, KR4854	KR9854**, KR9954***
7' 6" (2286mm)	7' 5" (2261mm)
8' 6" (2591mm)	*8' 5" (2565mm)
10' 6" (3200mm)	*10' 5" (3175mm)

* Only qualifying applications will be provided with UL Label.
 ** Fire rated same as 9854
 *** Fire rated same as 9954

Angle plate is used with narrow transom frames. The plate attaches to the transom extending the surface area needed to mount the mullion. Must be ordered separately. Specify finish.



154 Stabilizer is a two-piece interlocking set. One piece mounts on the mullion with the top mounting hole 5 3/16" (148mm) below the centerline of the strike; the other piece mounts on the door. Shims are provided to adjust for misalignment between the door and mullion.

The set maintains integrity between the door and mullion to prevent vandalism and to ensure contact between the device and strike as the doors expand and contract with temperature changes.



Furnished standard on aluminum mullions; optional for steel and all blank steel mullions.

MT54 Storage kit is a set of floor and wall brackets that provide convenient storage of the keyed removable mullion when removed from the opening.

To order, specify

- Model MT54
- Finish SP28, SP313, or SPBLK

Solutions and specialty products

Finger guards

Finger guards

Hand and finger protection for heavy-duty industrial applications, child care, school safety, hospitals, and workplaces.

A commercial-quality, maintenance-free product. Aluminum and flexible rubber available in grey color.

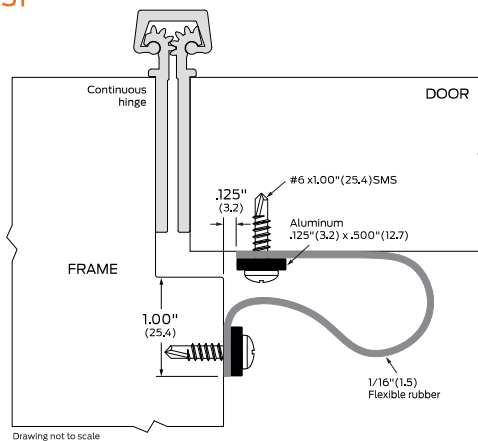
51A-90 (6.5" wide) For door opening up to 90°

51A-180 (8.5" wide) For door opening up to 180°

951 Cover for mortise type hinges



51

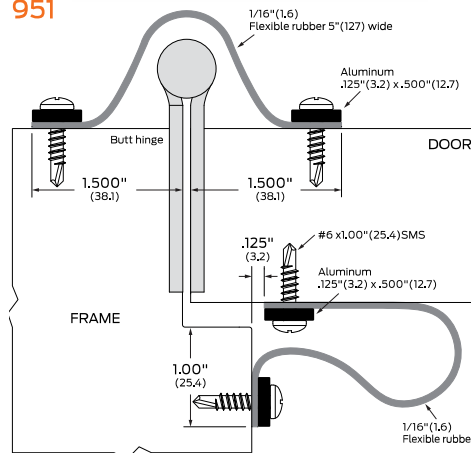


Finishes:
A, BK, D, G

Options:
SEC

Opening degree:
90, 180

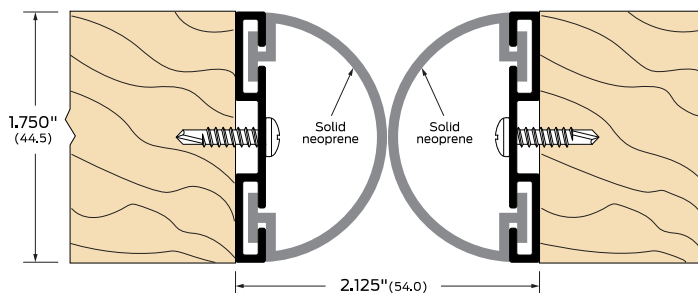
951



Finishes:
A, BK, D, G

Options:
SEC

72



Finishes:
A

Options:
SEC



Finishes:

A Aluminum Mill Finish
BK Black Anodized Aluminum
D Dark Bronze Anodized Aluminum
G Gold Anodized Aluminum

Options:

SEC Torx security screws

GT710/8710

Low-Energy
ADA Swing Door Operator
Where SOLUTIONS are AUTOMATIC



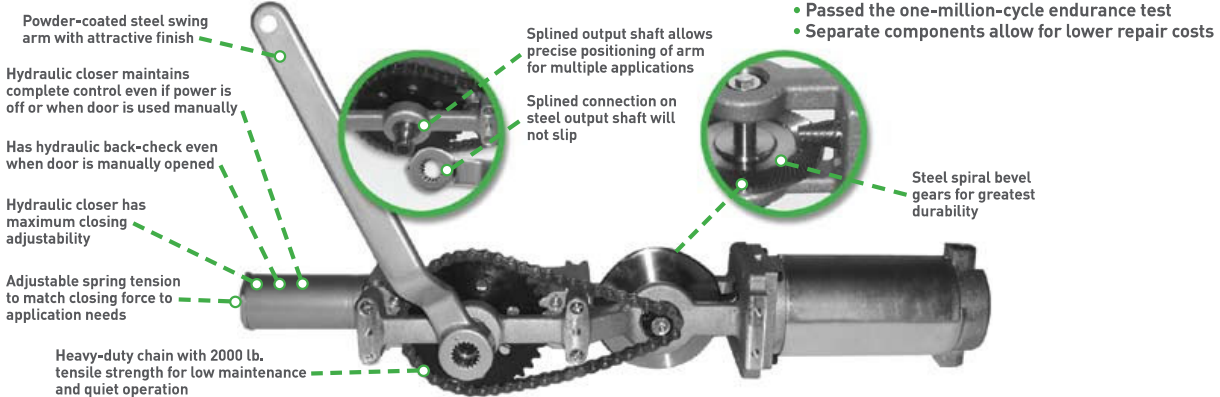
Product Features and Benefits

- Hydraulic design offers **proven reliability**
- Adjustable closing speeds to **enhance energy savings**
- Manual mode requires very little pressure to open **promoting ease of operation**
- Approved on fire door assemblies rated up to 3 hours, **maintaining security and safety**
- Hydraulic back-check during windy conditions **protects the door and operator from damage**



GT710/8710 Low-Energy ADA Swing Door Operator

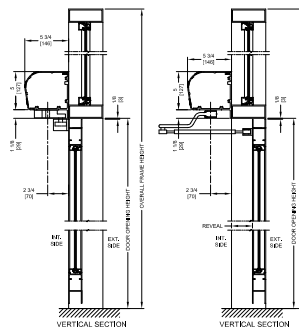
The NABCO GT710/8710 Low-Energy Operator is engineered for interior and exterior use, and designed to automate essentially any new or existing door frame. The GT710/8710 operates in both automatic and manual modes with a hydraulic back-check that protects the door and mechanical operator from damage when forced open in windy conditions or when manually operated. The GT710/8710 Operator has been approved for use on fire door assemblies rated up to 3 hours. The low-energy performance, combined with the adjustable opening and closing speeds, reduces energy consumed, which offers a prompt return on your investment.



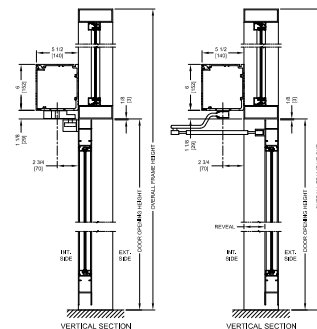
PRODUCT INFORMATION

Header dimensions	Side load - 5" H X 5 3/4" D (GT710) curved header Side load - 6" H X 5 1/2" D (GT8710)
Standard finish	Clear and dark bronze anodized
Optional finishes	Painted, clad, special anodized
Mounting	Surface applied or overhead concealed
Installation types	Push or pull
Operating voltage	120 VAC @ <5 amps
Auxiliary power output	12VDC 750mA
Operator drive	Electro-hydraulic
Motor voltage	Pulse width modulated
Motor type	1/8th HP @ peak
Control type	Microprocessor
Door panel weight	300 lbs.
Adjustable open	Force and speed
Adjustable close	Force and speed
Closing method	Spring/hydraulic [with selectable power assist]
Adjustable opening angle	Up to 145°
Power boost close	Selectable
Basic features	Low-energy operation Push and go Obstacle detection in opening and closing cycles Sequential or timer mode operation LCD display for programming and diagnostics Open- or closed-circuit safety inputs Momentary or maintained activation
Switch modes	On, off, hold-open
Opening and closing speed	Adjustable
Hold-open time	Adjustable [0-30 seconds]
Code compliances	ANSI A156.19/ANSI A117.1
Approvals	UL, ULC

GT710 Operator



GT8710 Operator



CONFIGURATIONS:

The GT710/8710 is available for multiple configurations, such as single doors, simultaneous pairs, and dual-egress, as well as the Opman configuration, which is a single continuous header for a pair of doors containing a manual closer on one side and an automatic operator on the other.

NABCO Service and Specifications

Along with the NABCO factory branches, NABCO has the largest independently owned network of automatic door distributors in North America. Their friendly, qualified installers and technicians always strive to exceed your expectations from install to after-sales service. NABCO's factory branches and independent distributors provide AAADM-certified technicians to ensure your doors meet all ANSI A156.10/A156.19 standards.

Complete three-part specifications and CAD drawings are available on the NABCO website.



Member of the Nabtesco Group

NABCO ENTRANCES INC.

S82 W18717 Gemini Drive | Muskego, WI 53150 | 877-622-2694 | Fax 888-679-3319

www.NABCOentrances.com | Email info@nabcoentrances.com



Distributed by:

CDH

Commercial Doors & Hardware Ltd.
2150 Winston Park Drive, Unit 16
Oakville, L6H 5V1

Mount Hope ES Reno 2025 HWDSB R1

Submittal Date: Nov 3/25, Nov 4/25, NOV 5/25, Nov 18/25

06/15

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 – Final Cleaning.
- .3 Section 01 78 00 - Closeout Submittals
- .4 Section 08 11 14 – Metal Doors and Frames.
- .5 Section 08 50 50 – Aluminum Windows.
- .6 Section 07 92 10 - Joint Sealing: caulking of joints between frames and other building components.
- .7 Section 10 28 10 – Toilet, Bath and Laundry Accessories.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI).
 - .1 ANSI/ASTM E330-02, Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C542, Specification for Lock-Strip Gaskets.
 - .2 ASTM D790, Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - .3 ASTM D1003, Test Method for Haze and Luminous Transmittance of Plastics.
 - .4 ASTM D1929, Test Method for Determining Ignition Temperature of Plastics.
 - .5 ASTM D2240, Test Method for Rubber Property - Durometer Hardness.
 - .6 ASTM E84, Test Method for Surface Burning Characteristics of Building Materials.
 - .7 ASTM F1233, Test Method for Security Glazing Materials and Systems.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-12.1-M90 Tempered or Laminated Safety Glass.
 - .2 CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass.
 - .3 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.
 - .4 CAN/CGSB-12.4-M91, Heat Absorbing Glass.
 - .5 CAN/CGSB-12.5-M86 Mirrors, Silvered.
 - .6 CAN/CGSB-12.6-M91, Transparent (One-Way) Mirrors.
 - .7 CAN/CGSB-12.8-97, Insulating Glass Units.
 - .8 CAN/CGSB-12.9-M91, Spandrel Glass.

- .9 CAN/CGSB-12.10-M76, Glass, Light and Heat Reflecting.
- .10 CAN/CGSB-12.11-M90, Wired Safety Glass.
- .11 CAN/CGSB-12.12-M90, Plastic Safety Glazing.
- .12 CAN/CGSB-12.13-M91, Patterned Glass.
- .13 CAN/CGSB-12.1-M90 Tempered or Laminated Safety Glass
- .14 CAN/CGSB-12.3-M76 Glass, Polished Plate or Float, Flat, Clear
- .4 Canadian Standards Association (CSA International).
 - .1 CSA A440.2, Energy Performance Evaluation of Windows and Sliding Glass Doors.
 - .2 CSA Certification Program for Windows and Doors.
- .5 Environmental Choice Program (ECP).
 - .1 CCD-045, Sealants and Caulking.
- .6 Flat Glass Manufacturers Association (FGMA).
 - .1 FGMA Glazing Manual.
- .7 Laminators Safety Glass Association (LSGA).
 - .1 LSGA Laminated Glass Design Guide.

1.3 SAMPLES

- .1 Submit a 300 x 300 sample of all glass products in accordance with Section 01 33 00 - Submittal Procedures.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 013300 – Submittal Procedures. Coordinate location with Consultant.

1.5 WARRANTY

- .1 Contractor hereby warrants glass against defects and failure, including leakage, under normal conditions of use, in accordance with the Contract, but for ten (10) years total, as follows:
- .2 Supplier shall submit a written warranty from the insulated glass manufacturer to replace or repair any defects in materials or sealed units for a period of ten (10) years from the date of Substantial Completion.
- .3 Mirrors:
 - .1 Submit a warranty for mirrors, covering the repair or replacement of defective work in accordance with the Contract, but for five (5) years total.
 - .2 Warranty shall apply against defects in workmanship and materials and, against silver deterioration and loosening of fastenings.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

- .2 Collect and separate for disposal material in appropriate on-site containers for recycling.
- .3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .4 Divert unused or damaged wood materials from landfill.
- .5 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .6 Divert unused caulking material from landfill to official hazardous material collections site approved by Consultant.
- .7 Plastic caulking tubes are not recyclable and must not be diverted for recycling with other plastic materials.

Part 2 Products

2.1 MATERIALS

- .1 Acceptable Manufacturers:
 - .1 AFG Glass Inc
 - .2 Libby-Owens Ford
 - .3 PPG Industries
- .2 Exterior Tempered Safety Glass: All exterior Vision Glass to exterior windows, curtain wall and non-fire-rated screens to be sealed insulated units conforming to CAN/CGSB-12.8. Exterior lite 6mm tempered clear glass, Solarban 70 Low Emmissivity Coating on inner pane (2nd surface), 13mm Argon filled air space, inner lite 6 mm clear tempered glass.
 - .1 All tempered glass to conform to CAN2-12.1 M-90 Type 2 tempered glass, Class B Double glazed units to have an integral non-metallic space creating a 13 mm hermetically sealed Argon filled air space. Spacers shall be continuous with butt joints (if any) at corners only. Pieces are not permitted. Butyl based spacers are not permitted.
- .3 Polished Plate or Float Glass: To CAN/CGSB-12.3 clear.
- .4 Spandrel Glass (SP): CAN/CGSB-12.9-M, 6 mm thick unless otherwise indicated, with water-based silicone emulsion coating applied to backside, 'Opaci-Coat 300' by ICD High Performance Coatings or approved alternative. Colour: To be selected by the Consultant.
- .5 Interior Tempered Safety Glass: CAN/CGSB-12.1-M, Type 2, Class B, Category II, clear, minimum 6 mm thick.
 - .1 All interior Vision Glass to non-fire rated interior doors and screens to be tempered 6 mm tempered clear float glass complete with etched tempered glass designation visible.
- .6 Glass for Interior Glazed Guardrail System

- .1 Provide 19 mm thick tempered glass for use at architectural glass railing system.
- .7 Fire Rated Glazing ('FR' 'FRG' or 'GW'): Firelite Plus, 8 mm thick laminated fire-rated polished and impact safety-rated ceramic glazing material by Technical Glass Products, or equivalent by Pyran Platinum L by Glassopolis, or Keralite Select L by VetroTech; accessory materials in compliance with UL/ULC test assembly and as recommended by glass manufacturer.
- .8 Georgian Wired rated glazing: not to be used on this project.
- .9 Spandrel glass (SP): CAN/CGSB-12.9-M, 6 mm thick unless otherwise indicated, with water-based silicone emulsion coating applied to backside, 'Opaci-Coat 300' by ICD High Performance Coatings or approved alternative. Colour: To be selected by the Consultant.
- .10 Mirrors: Refer to Section 10 28 10 Washroom Accessories.
- .11 Setting blocks: neoprene, 80 durometer hardness, 102 mm x 6 mm width to suit glass to extend from the fixed stop to the opposite face of the glazing unit.
- .12 Spacer Blocks: neoprene, thickness to provide a minimum glass to face clearance of 3mm.
- .13 Glazing tape: preformed polyisobutylene-butyl glazing tape with integral shim strip, 10-15 durometer, hardness, paper release, black color. Acceptable materials: Tremco Polyshim II by Tremco Ltd. or approved alternate.
- .14 Gasket: black neoprene "U" cavity type with lock strip.
- .15 Sealant: one component silicone, Spectrem 2 by Tremco Ltd. Refer to Section 07900.
- .16 Display cases: shelves to be 13mm tempered glass with polished rounded edges. Doors to be tempered 8mm tempered glass. Coordinate sizes and provide to Section 06 40 00 for installation.
- .17 Frosted Glazing Film:
 - .1 3M™ Crystal Glass Film
 - .2 To be applied to glazing on interior side of gymnasium windows.
- .18 Science Room 219 upper millwork doors AD625B; glass inserts to be 6mm tempered glass. Coordinate sizes and provide to Section 06 40 00 for installation.

2.2 FABRICATION

- .1 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:
- .2 Make field measurements before cutting and assembling materials.
- .3 Maintain minimum bite or lap of glass as recommended by the glazing unit manufacturer.
- .4 Each glass lite shall be labeled with the name of the product, weight and quality and year manufactured.

- .5 If requested, provide School Board or consultant access to the plant or shop to review fabrication. Consultant or School Board to provide 24 hour advance notice of visit.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 EXAMINATION

- .1 Verify that openings for glazing are correctly sized and within tolerance.
- .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.3 PREPARATION

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

3.4 INSTALLATION:

- .1 Inspect all glazing channels prior to application. All openings in joints and channels to be sealed shall be clean, dry and free of dust, oil, grease, loose mortar or any foreign material.
- .2 All surfaces to receive glazing tape shall be wiped dry with a clean rag dampened in Xylol, followed by a dry wipe.
- .3 Examine all sashes prior to glazing to determine if the openings are square and plumb. Any butt and miter joints which are open shall be sealed prior to glazing. Adjust all operating sashes and glaze in the closed position.
- .4 Compression Glazing:
 - .1 When butt joint is in a vertical direction, the glazier shall first run the tape on the head and sill members while going over the joint. If joints at the sash run horizontally, the tape must be applied first to the jambs so that it crosses over the joint.
 - .2 When an offset condition exists at each corner where a horizontal member passes behind vertical mullions, two different sized tapes shall be used to equalize the pressure seal. The thinner tape is to applied first on the glazing leg closest to the interior. The thicker tape shall be cut to the length between the two tapes and applied.

- .3 Each section of tape shall butt the adjoining tape and be united with a tool to eliminate any openings. Lapping of the adjoining tapes at the corners is not permitted.
- .4 Remove paper backing just prior to setting glass and apply a toe bead of sealant 150 mm long in each of the corners.
- .5 Position one setting block at the quarter point of each corner on the sill members or as recommended by IGMA guidelines.
- .6 Set the glass on the setting blocks and press firmly in place. Snap in the interior glazing stops.
- .7 Set the spacer blocks to prevent any “walking” of the lite.
- .5 Mirrors:
 - .1 Install mirrors by means of concealed vandalproof clips. If clips are used, install cushioning tape completing around perimeter of mirror back, set in concealed location within 25 mm of edge. Install fixed mirrors in washrooms at two different heights as indicated on drawings.
 - .2 Follow manufacturer’s installation recommendations.
- .6 Install any wired glass with the wire parallel to the opening.
- .7 Replace any loose glazing stops and tighten all screws.
- .8 Contractor shall include for needle point (cap beads) at all lower horizontal rail joints of all sash/glazing units at the discretion of and as may be requested by the Consultant or School Board.

3.5 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Remove traces of primer, caulking.
- .3 Remove glazing materials from finish surfaces.
- .4 Remove labels after work is complete.
- .5 Immediately upon job completion and when sealants have cured, remove any temporary protection and clean all exposed interior and exterior surfaces. Use proper cleaning materials only which will not harm the window components or any adjacent surfaces.
- .6 Ensure all temporary labels have been removed and fully cleaned.
- .7 Mirrors:
 - .1 Clean mirrors using non-abrasive soap or detergent and rinse with clean water. Leave in clean, polished condition for School Board occupancy.

3.6 INSPECTION

- .1 Where inspection is called for elsewhere in the specification, perform Window air and water leakage test to ensure installation meets performance requirements stated herein.

Should test fail, take remedial measures and re-test a different location at not additional cost to the School Board until the test passes.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 04 21 13 – Masonry
- .3 Section 09 22 16 – Non-structural Metal Framing.
- .4 Supply of access doors for mechanical and electrical devices in mechanical and electrical sections.

1.2 REFERENCES

- .1 Aluminum Association
 - .1 Designation for Aluminum Finishes.
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C36/C36M-01, Specification for Gypsum Wallboard.
 - .2 ASTM C79/C79M-01, Standard Specification for Treated Core and Non-treated Core Gypsum Sheathing Board.
 - .3 ASTM C442/C442M-01, Specification for Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board.
 - .4 ASTM C475, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .5 ASTM C514-01, Specification for Nails for the Application of Gypsum Board.
 - .6 ASTM C5579, Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
 - .7 ASTM C630/C630M, Specification for Water-Resistant Gypsum Backing Board.
 - .8 ASTM C840, Specification for Application and Finishing of Gypsum Board.
 - .9 ASTM C931/C931M, Specification for Exterior Gypsum Soffit Board.
 - .10 ASTM C954, Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - .11 ASTM C960/C960M, Specification for Pre-decorated Gypsum Board.
 - .12 ASTM C10021, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - .13 ASTM C1047, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - .14 ASTM C1280, Specification for Application of Gypsum Sheathing Board.
 - .15 ASTM C1177, Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - .16 ASTM C1178/C1178M, Specification for Glass Mat Water-Resistant Gypsum Backing Board.
- .3 Association of the Wall and Ceilings Industries International (AWCI)

- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CAN/CGSB-71.25, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .5 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.
- .2 Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.
- .3 Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

1.4 SITE ENVIRONMENTAL REQUIREMENTS

- .1 Maintain temperature minimum 10 degrees C, maximum 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.
- .2 Apply board and joint treatment to dry, frost free surfaces.
- .3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site for recycling.
- .3 Divert unused gypsum from landfill to gypsum recycling facility for disposal approved by Consultant.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .5 Divert unused wood materials from landfill to recycling facility.
- .6 Divert unused paint and caulking material from landfill to official hazardous material collections site approved by Consultant.
- .7 Do not dispose of unused paint and caulking materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

- .1 Standard board: to ASTM C36/C36M, 16 mm or 19 mm thick or as indicated, tapered edges.
- .2 Standard board: to ASTM C36/C36M, X Rated, 16 mm or 19 mm thick or as indicated, tapered edges.
- .3 Water-resistant board: to ASTM C630/C630M, 13 mm water resistant, tapered edges (WRGB in Finish Schedule).
- .4 Abuse resistant/Fire rated: to CSA A82.27-M1977 Fire-Rated Type X, 5/8" thick, "Abuse Resistant Fire Code" gypsum board panels, tapered edges, by CGC, Fibrerock interior AquaTuff and CertainTeed, AirRenew Extreme Abuse Resistant Type X Gypsum Board with M2Tech. All gypsum board to have anti-microbial and anti-mould properties.
- .5 All gypsum board to have Anti-Microbial and Anti Mold properties.
- .6 Nails: to ASTM C514.
- .7 Steel drill screws: to ASTM C1002.
- .8 Stud adhesive: to CAN/CGSB-71.25.
- .9 Laminating compound: as recommended by manufacturer, asbestos-free.
- .10 Concrete Anchors: Phillips Red Head TW-614 or equivalent. Do not use powder activated fasteners for ceiling support.
- .11 Tie Wire: #16 ga. galvanized soft annealed steel wire.
- .12 Caulking: Acoustical sealant.
- .13 38 mm thick mineral wool batts ULC labeled, if indicated on drawings.
- .14 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, 0.5 mm base thickness commercial sheet steel with G90 zinc finish, perforated flanges, and one piece length per location.
- .15 Sealants: in accordance with Section 07 92 10 - Joint Sealing.
- .16 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.
- .17 Joint compound: to ASTM C475, asbestos-free.

2.2 ACOUSTIC WALL ASSEMBLY AND NOISE BARRIER CEILING MATERIALS

- .1 **Location: Music Practice Rooms:**

- .2 Acoustic insulation inside partitions: AFB Acoustic Fire Bat by Roxul or equivalent product by Fibrex, or Quietzone by Owens Corning.
- .3 Steel deck closures: Emseal 25V Expanding Foam Sealant sized and shaped to fit flutes.
- .4 Acoustic Insulation: mineral fibre acoustical batt insulation, as specified under Section 07210. Thickness of 90% of wall assembly cavity depth; Acceptable products:
 - .1 Fibrex 'Sound Attenuation Fire Batt (SAFB)'
 - .2 Johns Manville 'Sound-SHIELD'.
 - .3 Roxul 'AFB'.
 - .4 Owens-Corning 'QuietZone'.
 - .5 CertainTeed Canada Inc., Sustainable Insulation NoiseReducer Sound Attenuation Batts.
- .5 Acoustical sealant: CAN/CGSB-19.21-M87; non-skinning acoustic sealant, non-hardening type.
- .6 Acoustical compound: pre-mixed perlite plaster.
- .7 Fasteners: use mechanical fasteners to secure batts into position as recommended by manufacturer.

Part 3 Execution

3.1 ERECTION

- .1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.
- .2 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.
- .3 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .4 Install work level to tolerance of 1:1200.

3.2 APPLICATION

- .1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical works are approved.
- .2 Apply single layer gypsum board to metal furring or framing using screw fasteners and laminating adhesive. Maximum spacing of screws 300 mm on centre.
 - .1 Single-Layer Application:
 - .1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C840.

- .2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.
- .2 Double-Layer Application:
 - .1 Install gypsum board for base layer and exposed gypsum board for face layer.
 - .2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.
 - .3 Apply base layers at right angles to supports unless otherwise indicated.
 - .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.
- .3 Apply concrete board where wall tiles are to be applied and adjacent to sinks or showers. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.
- .4 Apply gypsum board to concrete block surfaces, where indicated, using laminating adhesive.
- .5 Apply type X gypsum board where indicated, in accordance with U.L.C. requirements and with supplement to the National Building Code of Canada to obtain the required fire protection, fire rating and fire separation.
- .6 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
- .7 Where indicated on drawings, staple blanket to wallboard in accordance with ULC design requirements. Blanket shall be continuous and tightly fitted between studs and at perimeter.
- .8 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
- .9 Install gypsum board with face side out.
- .10 Do not install damaged or damp boards.
- .11 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.
- .12 Where a floor or roof structural member interferes with an interior partition wall at which a smoke or fire separation is required, a gypsum board enclosure with a fire rating not less than required for the wall must be provided to continue the required, a gypsum board enclosure with a fire rating not less than required for the wall must be provided to continue the required separation to the floor or roof above (typical)

3.3 INSTALLATION

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm on centre using contact adhesive for full length.
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.
- .4 Provide continuous polyethylene dust barrier behind and across control joints.
- .5 Locate control joints at approximate 10 m spacing on long corridor runs at approximate 15 m spacing on ceilings.
- .6 Install control joints straight and true.
- .7 Construct expansion joints at building expansion and construction joints. Provide continuous dust barrier.
- .8 Install expansion joint straight and true.
- .9 Install cornice cap where gypsum board partitions do not extend to ceiling.
- .10 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at 300 mm on centre.
- .11 Splice corners and intersections together and secure to each member with 3 screws.
- .12 Seal with acoustical sealant at ceilings, floors, wall intersections and all penetrations such as electrical outlets.
- .13 Install access doors to electrical and mechanical fixtures specified in respective sections.
 - .1 Rigidly secure frames to furring or framing systems.
- .14 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- .15 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish:
 - .1 Levels of finish:
 - .1 Level 0: No tapping, finishing or accessories required.
 - .2 Level 1: Embed tape for joints and interior angles in joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable.
 - .3 Level 2: Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener

- heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.
- .4 Level 3: Embed tape for joints and interior angles in joint compound and apply two separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
 - .5 Level 4: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
 - .6 Level 5: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.
- .16 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
 - .17 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
 - .18 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
 - .19 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
 - .20 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.
 - .21 Mix joint compound slightly thinner than for joint taping.
 - .22 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.
 - .23 Allow skim coat to dry completely.
 - .24 Remove ridges by light sanding or wiping with damp cloth.
 - .25 Provide protection that ensures gypsum drywall work will remain without damage or deterioration at time of substantial completion.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C645, Specification for Nonstructural Steel Framing Members.
 - .2 ASTM C754, Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.40, Primer, Structural Steel, Oil Alkyd Type.
- .3 Environmental Choice Program (ECP).
 - .1 CCD-047a, Paints - Surface Coatings.
 - .2 CCD-048, Surface Coatings - Recycled Water-borne.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal packaging material in appropriate on-site bins for recycling.
- .3 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .4 Divert unused gypsum materials from landfill to recycling facility approved by Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Non-load bearing channel stud framing: to ASTM C645, roll formed from 0.59mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum lath and metal lath. Knock-out service holes at 150 mm centres.
- .2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 30 mm legs for floor track, 50 mm for ceiling track.
- .3 Metal channel stiffener: 38 mm size, 2 mm thick cold rolled galvanized steel.
- .4 Metal Accessories: CSA A82.30.

- .5 “Unistrut” support channel framing, by Tyco Electrical and Metal Products.

Part 3 Execution

3.1 ERECTION

- .1 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.
- .2 Place studs vertically at 400 mm on centre and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .3 Erect metal studding to tolerance of 1:1000.
- .4 Attach studs to bottom track using screws.
- .5 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .6 Install steel frames and anchor frames securely to studs using minimum of three (3) anchors per jamb for jambs up to 2100 mm high and a minimum of four (4) anchors per jambs for jambs over 2100 mm high.
- .7 Provide two (2) studs at each side of openings wider than stud centre specified.
- .8 Install, cut to length, piece of runner horizontally over door frames and at top and bottom of rough opening in glazed partitions.
- .9 Provide 38 mm x 89 mm vertical and horizontal wood studs secured between metal studs for attachments of bathroom fixtures, accessories, cabinet work, and other fixtures, including grab bars, towel rails, attached to steel stud partitions.
- .10 Install steel stud or furring channel between studs for attaching electrical and other boxes.
- .11 Extend all partitions to underside of deck above for sound and fire separation.
- .12 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.

3.2 CEILING FURRING TO CANOPIES & CEILING PANELS

- .1 Provide to all interior and exterior canopies where shown to receive wood slat or plywood finishes.
- .2 Framing channel to be model P1000 (1-5/8”) ; 12 ga.
- .3 For exterior locations provide with 4 m dia. Holes at 500 o.c. for drainage and hot dip galvanize.

.4 Provide shop drawings for layouts.

.5 Refer to drawings for locations.

3.3 CEILING FURRING

.1 Install runners level to tolerance of 3 mm over 3.5 m. Provide runners at interruptions of continuity and change in direction.

.2 Frame with furring channels, perimeter of openings to accommodate access panels, light fixtures, diffusers, grilles, etc.

.3 Furr for bulkheads within or at termination or ceilings.

.4 Install furring channels at 400 mm o.c. maximum.

3.4 WALL FURRING

.1 Install steel furring, as indicated.

.2 Frame opening and around built-in equipment on four (4) sides with channels.

.3 Box-in beads, columns, pipes, and around exposed services.

3.5 FIRE RATED ASSEMBLIES

.1 If required, install Metal Stud System and Furring in accordance with appropriate ULC Design and with supplement to the National Building Code of Canada.

3.6 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 07 92 10 - Joint Sealing.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
 - .1 ANSI A108.1, Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).
 - .2 CTI A118.3, Specification for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive (included in ANSI A108.1).
 - .3 CTI A118.4, Specification for Latex Portland Cement Mortar (included in ANSI A108.1).
 - .4 CTI A118.5, Specification for Chemical Resistant Furan Resin Mortars and Grounds for Tile Installation (included in ANSI A108.1).
 - .5 CTI A118.6, Specification for Ceramic Tile Grounds (included in ANSI A108.1).
- .2 American Society for Testing and Materials (ASTM International) International
 - .1 ASTM C144, Specification for Aggregate for Masonry Mortar.
 - .2 ASTM C 207, Specification for Hydrated Lime for Masonry Purposes.
 - .3 ASTM C847, Specification for Metal Lath.
 - .4 ASTM C979, Specification for Pigments for Integrally Coloured Concrete.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CGSB 71-GP-22M, Adhesive, Organic, for Installation of Ceramic Wall Tile.
 - .3 CAN/CGSB-75.1, Tile, Ceramic.
 - .4 CAN/CGSB-25.20, Surface Sealer for Floors.
- .4 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A5-98, A8-98, A23.5-98, A362-98, A363-98, A456.1-98, A456.2-98, A456.3-98).
 - .2 CSA A123.3, Asphalt Saturated Organic Roofing Felt.
- .5 Terrazzo Tile and Marble Association of Canada (TTMAC)
 - .1 Tile Specification Guide 09300, Tile Installation Manual.
 - .2 Tile Maintenance Guide.

1.3 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Include manufacturer's information on:
 - .1 Ceramic tile, marked to show each type, size, and shape required.
 - .2 Chemical resistant mortar and grout (Epoxy and Furan).
 - .3 Cementitious backer unit.
 - .4 Dry-set Portland cement mortar and grout.
 - .5 Divider strip.
 - .6 Elastomeric membrane and bond coat.
 - .7 Reinforcing tape.
 - .8 Levelling compound.
 - .9 Latex-Portland cement mortar and grout.
 - .10 Commercial Portland cement grout.
 - .11 Organic adhesive.
 - .12 Slip resistant tile.
 - .13 Waterproofing isolation membrane.
 - .14 Fasteners.

1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Base tile: submit 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.
- .3 Floor tile: submit 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.
- .4 Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, colour, and size.
- .5 Provide bullnose trim at top course of wall tile in washrooms and locations shown on drawings..
- .6 Stair Accessories: submit duplicate samples of each trim.
- .7 Adhere tile samples to 11 mm thick plywood and grout joints to represent project installation.
- .8 Prepare a 2 m x 3m mock-up sample on site to ensure demonstration of installation details and quality control. Include stair accessories in mock-up.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in containers with labels legible and intact and grade-seals unbroken.
- .2 Store material so as to prevent damage or contamination.
- .3 Store materials in a dry area, protected from freezing, staining and damage.
- .4 Store cementitious materials on a dry surface.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal packaging material in appropriate on-site bins for recycling.
- .3 Unused adhesive, sealant and coating materials must be disposed of at an official hazardous material collections site as approved by the Consultant.
- .4 Unused adhesive, sealant and coating materials must not be disposed of into the sewer system, into streams, lakes, onto the ground or in other location where it will pose a health or environmental hazard.
- .5 Broken ceramic materials must be diverted from landfill to a local facility as approved by Consultant.

1.7 ENVIRONMENTAL CONDITIONS

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 °C for 48 h before, during, and 48 h after, installation.
- .2 Do not install tiles at temperatures less than 12 °C or above 38 °C.
- .3 Do not apply epoxy mortar and grouts at temperatures below 15 °C or above 25 °C.

1.8 EXTRA MATERIAL

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide minimum 5% of each type and colour of tile required for project for maintenance use. Store where directed.
- .3 Maintenance material to be of same production run as installed material.

1.9 EXTENDED WARRANTY

- .1 Submit a warranty for entire wall tile installation, covering materials and labour and the repair or replacement of defective work in accordance with the Contract, but for three (3) years total.

Part 2 Products

2.1 FLOOR TILE

- .1 Porcelain floor tile (Designation: POR 1-3): to CAN/CGSB-75.1.

- .1 Acceptable Materials: Size 300 mm x 600 mm; “Integra”, “Basaltina” or “Adrock”, by Centura or “Regal”, by Olympia Tile, all in matte finish. Allow for one (1) field colour from manufacturer’s full line and two (2) accent floor tiles.
- .2 Locations: First Floor corridors, vestibules, washrooms and stairs where indicated – refer to drawings. Refer to Room Finish Schedule for locations.
- .3 Install in a one-third staggered pattern.
- .4 Provide prefabricated movement joints in conjunction with slab saw cuts approx. 3500-6000mm distance (refer to floor pattern drawing).
- .2 Porcelain floor tile bull-nose base (Designation: POR): to CAN/CGSB-75.1.
 - .1 Acceptable Materials: Size 100 mm x 300 mm ‘sit-on’ bull-nose base or batascopa base; “Vitra”, “Integra” or “Adrock” (pending floor tile selected), by Centura or “Omnia” or “Regal” by Olympia Tile, in matte finish. Allow for two (2) colours from manufacturer’s Category/Group 2 colours. Include all inside and outside corner pieces compatible with bullnose masonry block corners.
- .3 Porcelain Tactile Attention Indicator Tiles: to CAN/CGSB-75.1.
 - .1 Acceptable Materials: Size 300 mm x 300 mm GT Black STOP Matt, 11 ¾” x 11 ¾”, as manufactured by Atlas Concorde and distributed by Centura Tile. Colour: contrasting to field tile.
 - .2 Conforming to OBC Article 3.8.3.18., required to be installed at the top of all stairs, starting one tread depth back from the edge of the top stair. The depth of the tactile attention indicator shall be not less than 300mm and not more than 610mm. Tactile attention indicator to be porcelain tile of contrasting colour from landing and stair treads with differing textured finish.
- .4 Designation CMT: 50 x 50 porcelain mosaic floor tile to CAN/CGSB-75.1.
 - .1 Acceptable materials: Dotti by Vitra as distributed by Centura Tile. 2 colours from full range in matte non-slip finish.
 - .2 Acceptable Alternates: Quebec distributed by Olympia; Dal ‘Keystone’ by Dal-tile and American Olean full mosaic collection, including ‘Egyptstone’ Series. Allow 2 colours from manufacturer’s full range.
 - .3 Include cove base, top slope edges, fitted corners; include all pieces and trims. Contractors to fit around bullnose block walls.
 - .4 Locations: Floors of all shower areas.

2.2 WALL TILE

- .1 Ceramic tile (Designation: **CWT-1**): to CAN/CGSB-75.1, Type 5, Class MR 4
 - .1 Size: 4” x 16”, matte surface.
 - .2 Two (2) colours to be selected from full colour line. Thin-set application.
 - .3 Acceptable Materials: Rainbow by Centura or similar approved by architect by Olympia.
 - .4 Locations: Washrooms and other locations noted on drawings.
- .2 Ceramic tile (Designation: **CWT-2**): to CAN/CGSB-75.1, Type 5, Class MR 4
 - .1 Size: 18”x48” matte rectangle
 - .2 One colour to be selected from full colour line. Thin-set application.
 - .3 Acceptable Materials:

- .1 “Lab Graffiti” by Portobello, dist. by Centura
- .4 Locations: **Forum 101** (floor to ceiling – vertical installation)
- .3 Tile Edging: Purpose-made, anodized aluminum, polished chrome finish, metal edge strips as manufactured Schluter Systems at all exposed tile edging: Profile to be selected by architect for appropriate application pending tile profile.
- .4 Soap Dishes: Supplied under Section 102810 – Washroom and Shower Accessories.
- .5 Locations: Washrooms, entrance Foyer Forum and locations in Corridors; refer to Interior Elevations

2.3 TRIM SHAPES

- .1 Conform to applicable requirements of adjoining floor and wall tile.
- .2 Use slip resistant trim shapes for horizontal surfaces of showers, overflow ledges, recessed steps, shower curbs, drying area curbs, and stools.
- .3 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.
- .4 Internal and External Corners: Provide trim shapes as follows where indicated.
 - .1 Bullnose shapes for external corners including edges.
 - .2 Coved shapes for internal corners.
 - .3 Special shapes for:
 - .1 Base to floor internal corners to provide integral coved vertical and horizontal joint.
 - .2 Base to floor external corners to provide bullnose vertical edge with integral coved horizontal joint. Use as stop at bottom of openings having bullnose return to wall.
 - .3 Wall top edge internal corners to provide integral coved vertical joint with bullnose top edge.
 - .4 Wall top edge external corners to provide bullnose vertical and horizontal joint edge.
- .5 Provide cove and bullnose shapes for where indicated and required to complete tile work.

2.4 MORTAR AND ADHESIVE MATERIALS

- .1 Manufacturer’s of commercial mortar, grout and adhesive having Product considered acceptable for use:
 - .1 Mapei
 - .2 Laticrete
 - .3 Flextile
- .2 Walls: Mortarcrete Latex Mortar conforming to ANSI A118.4200, manufactured by L & M Ceramo Inc.

- .3 Floors:
 - .1 Cement Mortar: Mixture of 1 part Portland cement, 4 parts dry sand and 1/10 hydraulic lime. Materials shall conform to the following:
 - .2 Portland Cement: To CAN3-A, Type 10.
 - .3 Hydrated Lime: To ASTM C-206 or 207, Type 5.
 - .4 Sand: To CSA A82.56, passing 1.6 mm sieve.
 - .5 Water: Potable, containing no contaminants which cause efflorescence.
 - .6 Thin Set Mortar: field mixed, blended sand-Portland cement-latex mortar, “Kerabond/Keralastic by Mapei.”
 - .1 Acceptable Alternates: “Laticrete 4237 distributed by Ceratec Inc., or Flextile 52 thin set.
 - .2 Latex Additive: “Cemtex” by Master Builders, Laticrete 2022” distributed by Ceratec Inc.,

2.5 GROUT

- .1 Colouring Pigments:
 - .1 Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.
 - .2 Colouring pigments to be added to grout by manufacturer.
 - .3 Job coloured grout are not acceptable.
 - .4 Use in Commercial Portland Cement Grout, Dry-Set Grout, and Latex-Portland Cement Grout.
- .2 Chemical-Resistant Grout for Walls:
 - .1 Epoxy grout: to ANSI A108.1, having quality, colour and characteristics to match epoxy bond coat. Adhesive and grout by same manufacturer.
 - .2 Epoxy Grout: “Latapoxy SP-100” Stainless, chemical resistant epoxy grout by Laticrete International. Colour from manufacturer’s full range. Alternate: Kerapoxy by Mapei.
- .3 Floors:
 - .1 Polymer modified grout as manufactured by MAPEI.

2.6 ACCESSORIES

- .1 Stairs Nosings and Edge Trims:
 - .1 Stair nosing to be Schluter, TREP-S, Aluminum support with thermoplastic rubber insert (26mm), installed in conjunction with porcelain tile as per manufacturer’s recommendations. Thermoplastic rubber insert piece colour to be selected by consultant.
 - .2 SCHIENE edge protection by Schluter, anodized aluminum to installed at all exposed stair tile edges. Mitre joints to suite stair angle. Size as required for tile and mortar bed.
- .2 Prefabricated Movement Joints: purpose made Schluter, Dilex-KSN aluminum, sized as required for tile and mortar bed. Colour to be selected by consultant. To be installed directly above slab saw-cuts. Refer to floor pattern drawing for locations.

- .3 Reinforcing mesh: 50 x 50 x 1.6 x 1.6 mm galvanized steel wire mesh, welded fabric design, in flat sheets.
- .4 Divider strips:
 - .1 Laminated strips, core 32 x 3 mm black neoprene, outsides (both sides) brass 32 x 1.29 mm complete with anchors, both sides spaced at 150 mm on centre.
 - .2 Brass complete with anchors, both sides spaced at 150 mm on centre.
- .5 Metal lath: to ASTM C847 galvanized finish, 10 mm rib at 2.17 kg/m².
- .6 Transition Strips: purpose made metal extrusion; stainless steel or anodized aluminum type.
- .7 Reducer Strips: purpose made metal extrusion; stainless steel or anodized aluminum type; maximum slope of 1:2.
- .8 Prefabricated Movement Joints: purpose made, having a Shore A Hardness not less than 60 and elasticity of plus or minus 40 percent when used in accordance to TTMAC Detail 301EJ.
- .9 Sealant: in accordance with Section 07 92 10 - Joint Sealing.
- .10 Floor sealer and protective coating: to CAN/CGSB-25.20 to tile and grout manufacturers recommendations.

2.7 MIXES

- .1 Portland Cement:
 - .1 Scratch coat: 1 part portland cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand, 1 part water, and latex additive where required. Adjust water volume depending on water content of sand.
 - .2 Slurry bond coat: portland cement and water mixed to creamy paste. Latex additive may be included.
 - .3 Mortar bed for floors: 1 part portland cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.
 - .4 Mortar bed for walls and ceilings: 1 part portland cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand and 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.
 - .5 Levelling coat: 1 part portland cement, 4 parts sand, minimum 1/10 part latex additive, 1 part water including latex additive.
 - .6 Bond or setting coat: 1 part portland cement, 1/3 part hydrated lime, 1 part water.
 - .7 Measure mortar ingredients by volume.
- .2 Dry set mortar: mix to manufacturer's instructions.
- .3 Organic adhesive: pre-mixed.
- .4 Mix bond and levelling coats, and grout to manufacturer's instructions.

- .5 Adjust water volumes to suit water content of sand.

2.8 PATCHING AND LEVELING COMPOUND

- .1 Portland cement base, acrylic polymer compound, manufactured specifically for resurfacing and levelling concrete floors. Products containing gypsum are not acceptable.
- .2 Have not less than the following physical properties:
 - .1 Compressive strength - 25 MPa.
 - .2 Tensile strength - 7 MPa.
 - .3 Flexural strength - 7 MPa.
 - .4 Density - 1.9.
- .3 Capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish.
- .4 Ready for use in 48 hours after application.

2.9 TERRAZZO FLOOR PATCHING

- .1 Where applicable, saw cut existing terrazzo floor and base as required and remove to nearest metal 'panel' joint to enable replacement at a full panel. Replace with terrazzo flooring to match existing as closely as possible. Provide sample to consultant for approval.

2.10 CLEANING COMPOUNDS

- .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and levelling compounds and elastomeric waterproofing membrane and coat.
- .2 Materials containing acid or caustic material are not acceptable.

Part 3 Execution

3.1 WORKMANSHIP

- .1 Do tile work in accordance with TTMAC Tile Installation Manual, "Ceramic Tile", except where specified otherwise.
- .2 Apply tile to clean and sound surfaces.
- .3 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.
- .4 Maximum surface tolerance 1:800.
- .5 Make joints between tile uniform and approximately 1.5 mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.

- .6 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .7 Install floor tiles as per pattern. Layout and install flash cove tile first, before floor tile, ensuring a flush edge on the horizontal surface by feathering to masonry walls as required to produce a straight line on the floor. Install floor tiles to pattern supplied by Architect at a later date. Contact consultant to review when approximately no more than 10 sq. m has been installed.
- .8 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .9 Make internal angles square, external angles rounded.
- .10 Make internal angles square, external angles chamfered at 45° with narrow tile strip.
- .11 Construct cove base, as described using all special pieces available for inside and outside corners.
- .12 For Floors: Use bull nose edged tiles at termination of wall tiles, except where tiles abut projecting surface or differing plane.
- .13 Seal grouted joints with sealer.
- .14 Keep building expansion joints free of mortar or grout.
- .15 For Walls: Use round edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.
- .16 Install divider strips at junction of tile flooring and dissimilar materials.
- .17 Allow minimum 24 h after installation of tiles, before grouting.
- .18 Clean installed tile surfaces after installation and grouting cured.

3.2 FLOOR TILE

- .1 Install in accordance with TTMAC to applicable thinset detail.

3.3 STAIR TILE ACCESSORIES

- .1 Install all accessories specified per manufacturer's instructions using whole lengths.
- .2 Provide sample installation for architect for review.

3.4 FLOOR SEALER AND PROTECTIVE COATING

- .1 Advise School Board and Consultant prior to application of any floor or tile sealer.
- .2 If approved, apply in accordance with manufacturer's instructions.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.
- .3 Section 06 10 10/06101 - Rough Carpentry: Wood strapping.
- .4 Fabrication: to ASTM 365-78 and CAN/GSB-92.1-M77.
- .5 Installation: to ASTM C636-76, except where specified otherwise.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM E1264, Classification for Acoustical Ceiling Products.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.
 - .2 CAN/CGSB-92.1-M8, Sound Absorptive Prefabricated Acoustical Units.
- .3 Canadian Standards Association (CSA)
 - .1 CSA B111, Wire Nails, Spikes and Staples.
- .4 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102, Surface Burning Characteristics of Building Materials.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two each 300 x 300 mm samples of each individual tile and grid type in accordance with Section 01340.

1.4 REGULATORY REQUIREMENTS

- .1 Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by a Canadian Certification Organization accredited by Standards Council of Canada.

1.5 DESIGN CRITERIA

- .1 Maximum deflection 1/360 of span to ASTM 365-78 deflection test.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Permit wet work to dry before commencement of installation.
- .2 Maintain uniform minimum temperature of 15°C and humidity of 20 - 40% before and during installation.
- .3 Store materials in work area 48 hours prior to installation.

1.8 EXTRA MATERIALS

- .1 Provide extra materials of acoustic units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide acoustical units amounting to 2 % of gross ceiling area for each pattern and type required for project.
- .3 Extra materials to be from same production run as installed materials.
- .4 Clearly identify each type of acoustic unit, including colour and texture.
- .5 Store where directed by Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Acoustic units for suspended ceiling system: to CAN/CGSB-92.1.
- .2 Acoustic Ceiling Panels, Designation LAP: Acoustic Ceiling Panels, wet formed mineral fibre panels, by Armstrong World Industries Canada Inc., Mississauga. Colour: White; Types as noted below:
- .3 **Panel Types:**
 - .1 Type 1: LAP: 600 x 1200 mm x 15.9 mm thick; 'Fine Fissured' with medium texture, Square Lay-In, #1729; Location: For use at classroom areas, corridors and all other areas as indicated.
- .4 Acceptable alternates for LAP: similar purpose-designed high humidity ceiling panels by CGC Interiors, BPB Canada Inc. and Certainteed.
- .5 **Suspension System Type 1:** 23.8 mm (15/16") "Prelude XL" exposed tee bar grid, including wall moulding, by Armstrong. Colour: white. Acceptable alternate: similar suspension system by CGC Interiors, Oakville and Chicago Metallic Corp. Grid sizes to suit ceiling panel types as shown on drawings.
- .6 **Hanging Panel Trim:** 150mm Axiom Classic Trim by Armstrong World Industries Canada Inc., or acceptable alternate. Location: Applications Room 206.
- .7 **Accent Hardware:** 'Capz (ARCAPSL)' by Armstrong World Industries Canada Inc., or acceptable alternate in silver colour with smooth finish. For use with Type 2 ACP acoustic tile above, in Music and Art Classrooms.

- .8 Suspension System for Radiant Panel Heaters: not applicable to this project.
- .9 Hangers: 2.6 mm galvanized soft annealed steel wire.
- .10 Accessories: splices, clips, retainers, etc., to complement suspension system components.
- .11 Adhesive: low VOC type recommended by acoustic unit manufacturer.
- .12 Staples, nails and screws: to CSA B111 non-corrosive finish as recommended by acoustic unit manufacturer.
- .13 Hold down clips: purpose made clips to secure tile to suspension system, approved for use in fire-rated systems.

Part 3 Execution

3.1 EXAMINATION

- .1 Do not install acoustical panels and tiles until work above ceiling has been inspected by Consultant.

3.2 INSTALLATION

- .1 Install acoustical panels and tiles in ceiling suspension system.
- .2 Install acoustic units parallel to building lines with edge unit not less than 50% of unit width.
- .3 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.
- .4 Support suspension system main runners at 1200 oc maximum with hangers from structure. Assembly shall support super-imposed loads. Maximum permissible deflection, 1/360 of span.
- .5 Attach cross member to main runner to provide rigid assembly.
- .6 Install suspension assembly to manufacturer's written instructions.
- .7 Install flush edge moulding at junction of acoustic unit ceiling and other materials around entire length of joint. Secure to construction. Butt joints neatly, square and true in alignment.
- .8 Set acoustic units in place.
- .9 Set all ceiling levels by the use of transit or laser level.
- .10 Ensure all installations are clean upon School Board acceptance. Be responsible for monitoring damage and soiling after installation and before School Board occupancy. Prior to School Board takeover, replace all tiles with damage, blemishes or soiling

whether caused by subcontractor handling or post installation above-ceiling adjustments, balancing, cabling, etc.

- .11 Provide for School Board twelve (12) complete, undamaged ceiling tiles of each type, sealed and boxed. Leave in location as directed by Architect.

3.3 INTERFACE WITH OTHER WORK

- .1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM F1303, Specification for Sheet Vinyl Floor Covering with Backing.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-ISO 14040, Environmental Management - Life Cycle Assessment - Principles and Framework (Adopted ISO 14040).

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base, nosing, feature strips, treads, edge strips.

1.4 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20° for 48 hours before, during and 48 hours after installation.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot approved by Consultant.
- .2 Divert unused metal and wiring materials from landfill to metal recycling facility approved by Consultant.
- .3 Remove from site and dispose of packaging materials at appropriate recycling facilities.

1.7 QUALITY ASSURANCE

- .1 Supplier shall be an established firm experienced in the field.
- .2 Installer:
 - .1 Flooring contractor experienced in the field and approved by the manufacturer.
 - .2 Flooring contractor shall have manual instructions and be trained by the manufacturer and distributor.

- .3 Manufacturer's recommendations for the correct preparation, finishing and testing sub floor surface.

1.8 EXTENDED WARRANTY

- .1 Submit a warranty for all the installation of all resilient sheet flooring, covering materials and labour and the repair or replacement of defective work in accordance with the General Conditions of the Contract, but for seven (7) years total.

Part 2 Products

2.1 MATERIALS

- .1 Resilient Sheet Flooring **Type 1** (SF-Sp): Acceptable materials:
 - .1 Acceptable Materials:
 - .1 Gerflor, Taraflex Sport 'M Plus' (7 mm).
 - .2 Tarkett Omni Sports 7.1 Greenlay (7.1mm).
 - .3 V-Sport 710 by Funktion Surfaces as distributed by Caliber Sport.
 - .4 Tarkett ActionSport 65 (6.5mm).
 - .5 Centura DURAmultisport by Interflor (5.0mm)
 - .2 Locations: Gymnasium. Refer to Room Finish Schedule and Drawings
- .2 Resilient Sheet Flooring **Type 2** (SF): Acceptable materials:
 - .1 Acceptable Materials:
 - .1 Gerflor, Taraflex Multi-Use (3.0 mm).
 - .2 Gerflor, Taralay Indiana (3.0 mm).
 - .3 Granite by Domco-Tarkett (4.0 mm).
 - .4 Tarkett OmniSports 3.5 (3.5mm).
 - .5 V-Sport 350 by Funktion Surfaces as distributed by Caliber Sport.
 - .2 Locations: Childcare & Kindergarten classrooms and associated cubbie areas. Refer to Room Finish Schedule and Floor Pattern Drawing.
- .3 Allow for two (2) colours from manufacturer's full range for Kindergarten Classrooms.
 - .1 Surface resistance: Unaffected by surface water and chemicals.
 - .2 Slip resistance tested in accordance with ASTM D2047 Static coefficient of friction: Dry 0.95, Wet 0.93.
 - .3 Meets ULC 102.2 Flame spread 5, Smoke developed 295.
 - .4 Wear Resistance: ASTM C501 Wear index 436.
 - .5 Static Load Limit: 500 PSI.
 - .6 Hygiene: Bacteriostat retards the growth of bacteria.
- .4 Self Levelling Underlayment: "Ultraplan 1" by Mapei fast setting, polymer-modified; for over cured concrete, plywood, ceramic tile, old cutback adhesive, and old vinyl and vinyl composition flooring, feather edge to 1 1/2" (38 mm).for use to prepare floor at locations where existing flooring has been removed and subfloor is not level..
- .5 Filler and Cover Former:

- .1 As recommended by manufacturer to suit subfloor on which its material is installed and to suit vertical wall/floor junctions.
- .6 Primers and Adhesives: As recommended by manufacturer of material to suit subfloor condition.
- .7 Cleaner: Neutral chemical compound that will not damage sheet or affect its colour.
- .8 Welding Rod: PVC welding rod, colour to match resilient sheet flooring.
- .9 Cap strip: sized to suit application, type recommended by flooring manufacturer, Altro Stainless Steel Cap, mechanically fastened to wall

Part 3 Execution

3.1 SITE VERIFICATION OF CONDITIONS

- .1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.

3.2 PREPARATION

- .1 Scope includes preparation of floor using self levelling coating and patching compound as required.
- .2 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .4 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.
- .5 As required, seal concrete slab to resilient flooring manufacturer's printed instructions.

3.3 INSTALLATION

- .1 Install on a smooth, flat concrete finish, which will be achieved manually or mechanically.
- .2 Ensure concrete sub floor temperature to be maintained at a minimum of 70°F during installation and ensure the moisture content does not exceed 3 Lbs per 1000 Sq Ft per 24 hours or lower.
- .3 Paint game lines using approved game line paint primer and game line paint in strict accordance with the game line paint manufacturer's instructions.
- .4 Before proceeding with any work, inspect the sub floor surface and report, in writing, to the project manager and the General Contractor any visible defect on the surface, such as cracks, bumps, rough areas or variations in planarity.

- .5 This installation is to proceed on an existing concrete slab in addition to new concrete work as required for mechanical services. Ensure slab is adequately cured and free of moisture or contaminants. If necessary, as part of the work of this section, scarify existing surfaces to prepare surface for adhesive, or to meet manufacturer's installation requirements. Fill joints, cracks, and holes in these surfaces and level surface irregularities with filler. Remove prime paint and wire brush steel base surfaces.
- .6 Check for any grease, oil, paint, duct or any combination remaining on the concrete sub floor.
- .7 Before proceeding with installation, clean concrete surface to remove any dirt or foreign materials, rinse thoroughly and allow eight (8) hours minimum to dry, if required, sanding is necessary in all installations.
- .8 Fill any areas not meeting $\pm 1/8''$ in 10' for level before installation. This will insure levelness and proper adhesion of material.
- .9 Lay each material in accordance with manufacturer's specifications.
- .10 Weld joints on flooring and internal and external angles of coves using welding rod in matching plain colours, and the standard hot-air-welding technique.
- .11 Install standard rubber base at resilient sheet flooring locations.
- .12 Flash into drain openings; do not cut on surface at edge of drain cover. Coordinate with Division 15 for installation with suitable drain type and cover. Bond flooring to drain flange under clamping ring using epoxy adhesive.
- .13 Extend resilient sheet under all cabinet work and casework to the wall line.

3.4 CLEANING

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Clean, seal and wax floor and base surface to flooring manufacturer's printed instructions.

3.5 PROTECTION

- .1 Protect new floors from time of final set of adhesive, with polyethelene or Kraft paper until final inspection.
- .2 Prohibit traffic on floor for 48 hours after installation.
- .3 Do not wax.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 30 00 – Cast-in-Place Concrete.
- .3 Section 03 35 05 – Concrete Floor Hardeners.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM F1066, Specification for Vinyl Composition Floor Tile.
 - .2 ASTM F13440, Specification for Rubber Tile.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-25.20, Surface Sealer for Floors.
 - .2 CAN/CGSB-25.21, Detergent-Resistant Floor Polish.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling.
- .3 Dispose of unused finish and adhesive materials at official hazardous material collections site approved by Consultant.
- .4 Do not dispose of unused finish and adhesive materials into sewer system, into streams, lakes, onto ground or in other locations where it will pose health or environmental hazard.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20°C for 48 hours before, during and for 7 days after installation.

1.6 EXTRA MATERIALS

- .1 Provide 6 m² or 3% of each colour, pattern and type flooring material required for this project for maintenance use.
- .2 Extra materials to be from same production run as installed materials.

- .3 Clearly identify each container of floor tile and each container of adhesive.
- .4 Store where directed by Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Luxury Vinyl Tile (LVT): 3mm tile thickness, 299mm x 1219mm (9" x 48") or 457 x 457mm (18" x 18") size square or plank sizing, with 20 year commercial warranty. Allow for total of three (3) colours from full line.
 - .1 Acceptable Manufacturers:
 - .1 Mirra, by Centura
 - .2 I.D. Latitude, by Tarkett
 - .3 Natural Creations Arbor Art, by Armstrong
 - .4 Spacia First 20, by Mannington
 - .5 Lavencia, by Altro
 - .2 Resilient base (RR): rubber, top set coved, 3 mm thick, rubber, 100 mm high minimum 1200 mm long, including premoulded end stops and external corners. Acceptable materials: non-shrink Rubber Wall Base with toe as manufactured by Johnsonite, Roppe or approved alternates. Colours: Six (6) from full Johnsonite "Coloright" colour line.
 - .1 Rubber Stair Tread/ Riser combination (RSTR): Minimum of 5 mm thick, visually impaired Round Raised Disk pattern, rubber one-piece tread/ riser combination with speckled pattern. Stair tread to be one piece, for full width of stair. Include contrast strip on stair nosing for visual impaired, including mid and upper landings. Acceptable materials: VIRTR-Rd, as manufactured by Johnsonite, ROPPE, Activa Rubber Flooring, Flexco or Nora Rubber Flooring. Stair tread with contrast edge strip and no upstand is to be inserted into floor tile at top stair at mid and top landings. Stair treads to be speckled using minimum three colours.
 - .2 Rubber Tile at Stair Mid and Upper Landings (RT): Minimum of 5 mm thick, hammered finish rubber tile, 600mm x 600mm square. Stair tread with contrast edge strip and no upstand is to be inserted into floor tile at top stair at mid and top landings. Acceptable materials: Johnsonite, ROPPE, Activa Rubber Flooring, Flexco, or Nora Rubber Flooring. Tile to be marbleized or speckled using three colours.
 - .3 Tactile attention indicator: conforming to OBC Article 3.8.3.18. required to be installed at the top of all stairs, starting one tread depth back from the edge of the top stair. The depth of the tactile attention indicator shall be not less than 300mm and not more than 610mm. Tactile attention indicator to be rubber tile of contrasting colour from landing and stair treads with differing textured finish.
 - .4 Primers and adhesives: waterproof, recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade. Use Johnsonite 990 Solvent Free Environmentally Safe White Acrylic Cove Base Adhesive for rubber base. Use Roberts #2057 clear water resistant low odour adhesive for VCT.

- .5 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste, as recommended by flooring manufacturer for use with their product.
- .6 Metal edge strips: aluminum extruded, smooth, with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .7 Polyethylene sheet: to CAN2 51.33-M77, Type 2, for protection.
- .8 Nose filler: Epoxy caulking compound Johnsonite 930.
- .9 Solid vinyl colour strips: smooth 3 mm thick pre-cut vinyl colour strips to location and dimensions as shown on gymnasium plan A18.

Part 3 Execution

3.1 INSPECTION

- .1 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer. Inspect for negative alkalinity, carbonization or dusting.
- .2 Commencement of work indicates acceptance of conditions by flooring installer.

3.2 SUB-FLOOR TREATMENT

- .1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .2 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.

3.3 TILE APPLICATION

- .1 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .2 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.
- .3 Install tiles in corridor as per pattern provided by Consultant. Pattern will be provided at a later date.
- .4 Cut tile and fit neatly around fixed objects.
- .5 Install flooring in pan type floor access covers. Maintain floor pattern.
- .6 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.
- .7 Install metal edge strips at unprotected or exposed edges where flooring terminates.

- .8 At doorways to incrapack units, extend tile and base fully into door opening to incrapack classroom.
- .9 Install solid colour vinyl strips, manufactured for this purpose, to form gymnasium game lines, as indicated on drawings. Cut field tiles tight and smooth contour against game lines. Strips to be minimum of 300 mm long on curves and of indicated width and colour.
- .10 Install solid colour vinyl strips, manufactured for this purpose, to indicate the hazardous zone around equipment in the STAC classroom. Cut field tiles tight and smooth contour against the solid coloured lines.

3.4 STAIR APPLICATION

- .1 Areas to receive stair treads shall be clean, fully enclosed, weathertight, and maintained at a uniform temperature of at least 70°F for 24 hours before, during, and after the installation is completed. The stair treads and adhesives shall be conditioned in the same manner. Stair steps shall be smooth, flat, level, permanently dry, clean and free of all foreign material, such as dust, paint, grease, oils, solvents, curing and hardening compounds, sealers, asphalt and old adhesive residue. An epoxy caulking nose filler shall be applied to ensure a tight fit and eliminate any open spaces between the step edge and stair tread nosing. Stair treads shall be trimmed to within 1/16" of the riser and stringer to allow for expansion. Adhesives shall be applied to the stair step surface and the back and nosing area of the stair tread. Stair treads shall be rolled, with a J-hand roller, after installation, to ensure proper bonding.

3.5 BASE APPLICATION

- .1 Lay out base to keep number of joints at minimum. Use lengths as long as practicable and not less than minimum 500 mm long.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .7 Miter internal corners. Use premoulded corner pieces at all external corners and ensure full adhesion through to ends of corner pieces. See detail for termination at door frames.
- .8 Install toeless type base before installation of carpet on floors.
- .9 Leave in the building one (1) complete carton of each of two (2) colours of floor tile and twelve (12) tiles of each of the remaining colours. Colours of extra tile to be specified by Consultant.

3.6 INITIAL MAINTANANCE AFTER INSTALLATION

- .1 Broom sweep or vacuum thoroughly.
- .2 Do not wet mop, wash, scrub, or strip the floor. These procedures will be done by the School Board.

3.7 PROTECTION OF FINISHED WORK

- .1 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 just before final inspection.
- .2 Prohibit traffic on floor for 48 hours after installation.

3.8 PREPARATION FOR INSPECTION

- .1 Only if so notified by Architect, and in the presence of the School Board, scrub the floor using a neutral detergent and a floor machine of 170-250 rpm capability equipped with a scrub brush or a scrubbing pad (3M blue or equal).
- .2 Lightly rinse and allow to dry. Note: Do not flood the floor with rinse water, scrubbing, or stripping solutions. Final re-washing, if required, and waxing will be done by School Board.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 51 00 - Temporary Utilities.
- .3 Section 01 78 00 - Closeout Submittals.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No.27.6, Textile Test Methods - Flame Resistance - Methemine Tablet Test for Textile Floor Coverings.
 - .2 CAN/CGSB-4.2 No.77.1/ISO 4919, Textile Test Methods - Carpets - Determination of Tuft Withdrawal Force.
 - .3 CAN/CGSB-4.129, Carpets for Commercial Use.
 - .4 CAN/CGSB-25.20, Surface Sealer Floors.
- .2 Carpet and Rug Institute (CRI)
 - .1 CRI-104, Standard Installation of Commercial Carpet.
 - .2 IAQ Carpet Testing Program.
- .3 National Floor Covering Association (NFCA)
 - .1 Floor Covering Specification Manual.
- .4 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC-S102.2, Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.

1.3 SUBMITTALS

- .1 Submit control submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit verification to demonstrate compliance with CAN/ULCS102 and CAN/ULCS102.2.
- .3 Submit proof that carpet has been tested and passed the Indoor Air Quality (IAQ) Carpet Testing Program requirements of the Carpet and Rug Institute (CRI) and the Canadian Carpet Institute (CCI).
- .4 Submit report verifying that tuft bind meets requirements of CAN/CGSB-4.129 when tested to CAN/CGSB-4.2 No.77.1.
- .5 Submit report outlining proposed dust control measures.
- .6 Submit carpet schedule using same room designations indicated on drawings.

- .7 Submit carpet manufacturer's installation instructions: Indicate special procedures and perimeter conditions requiring special attention.

- .8 Submit certification and description of carpet recycling process

1.4 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit product data sheet for each carpet, adhesive and subfloor patching compound.
- .3 Submit WHMIS SDS - Safety Data Sheets acceptable to Labour Canada and Health Canada for carpet adhesive and seam adhesive. Indicate VOC content.
- .4 Submit data on specified products, describing physical and performance characteristics, sizes, patterns, colours, and methods of installation.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate locations and lengths of seams for carpeted areas.
- .3 Indicate nap direction, open edges, special patterns, and other details required by Consultant to clarify work.
- .4 Submit drawings showing columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cut-outs are required as well as direction of carpet pile and pattern, location of edge mouldings and edge bindings to Consultant for review prior to installation of carpet.

1.6 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 225 x 225 mm pieces for each colour selected, 150 mm lengths of carpet gripper and binder bars, base, divider strips.

1.7 CLOSEOUT SUBMITTALS

- .1 Submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Submit maintenance data: Include maintenance procedures, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.
- .3 Schedule of carpet reclamation activities indicating following:
 - .1 Detailed sequence of removal work.
 - .2 Inventory of items to be removed and reclaimed.
 - .3 Proposed packing and transportation measures.

- .4 Certification: Reclamation Agency to verify in writing that used carpet was removed and recycled in accordance with carpet manufacturers' reclamation program.
 - .1 Record off-site removal of debris and materials and provide following information regarding removed materials.
 - .1 Time and date of removal.
 - .2 Type of material.
 - .3 Weight and quantity of materials.
 - .4 Final destination of materials.

1.8 QUALIFICATIONS

- .1 Installer Qualifications:
 - .1 Flooring contractor requirements.
 - .1 Specialty contractor normally engaged in this type of work, with prior experience in installation of these types of materials.
 - .2 Certified by carpet manufacturer
 - .3 Must not sub-contract labour without written approval of Consultant.
- .2 Be responsible for proper product installation, including floor testing and preparation as specified and in accordance with carpet manufacturers written instructions.

1.9 REGULATORY REQUIREMENTS

- .1 Prequalification: tested to CAN/CGSB-4.2-No.27.6.
- .2 Indoor Air Quality: compliance with CRI/CCI Green Label Indoor Air Quality Program, CRI/CCI-IAQ requirements for maximum total volatile chemicals released into air. Label each carpet product with CRI/CCI-IAQ label.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Label packaged materials. For carpet tile products indicate nominal dimensions of tile and indicate installation direction.
- .2 Packaging, labelling, packing and marking details.
- .3 Store packaged materials in original containers or wrapping with manufacturer's seals and labels intact.
- .4 Store carpeting and accessories in location as directed by Consultant. Store carpet and adhesive at minimum temperature of 18°C and relative humidity of maximum 65% for minimum of 48 hours before installation.
- .5 Prevent damage to materials during handling and storage. Keep materials under cover and free from dampness.
- .6 Store materials in area of installation for minimum period of 48 hours prior to installation.

- .7 Modular carpet: store on pallet form as supplied by Manufacturer. Do not stack pallets.

1.11 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Vacuum used carpet before removal.

1.12 ENVIRONMENTAL REQUIREMENTS

- .1 Moisture: Ensure substrate is within moisture limits and alkalinity limits prescribed by manufacturer. Prepare moisture testing and provide report to Consultant
- .2 Temperature: Maintain ambient temperature of not less than 18 °C from 48 hours before installation to at least 48 hours after completion of work.
- .3 Relative humidity: Maintain relative humidity between 10 and 65% RH for 48 hours before, during and 48 hours after installation.
- .4 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.
- .5 Ventilation:
 - .1 Ventilate area of work as directed by Consultant by use of approved portable supply and exhaust fans.
 - .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities. Provide fans with HEPA filters.
 - .3 Provide continuous ventilation during and after carpet application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of carpet installation.
- .6 Test existing floor levelling compound for presence of asbestos contamination. Notify Consultant for additional instructions where asbestos is discovered.
- .7 Do not install carpet until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete.

1.13 EXTRA MATERIALS

- .1 Provide extra materials of carpet, carpet base, and adhesives in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide 20 m² of each colour, pattern and type of carpeting.
- .3 Extra materials to be from same production run as installed materials.
- .4 Identify each package of carpet and each container of adhesive.
- .5 Deliver to Consultant and store where directed by Consultant.

Part 2 Products

2.1 MANUFACTURERS

- .1 Certified to Carpet and Rug Institute's and the Canadian Carpet Institute IAQ requirements.

2.2 CARPETING (CPT) – Flocked Flooring

Product shall be suitable for direct glue-down installation as per CGSB-4-SP-156. The consultant may select any of the following styles from one of the manufacturers listed below.

- 1. Forbo Flotex flocked flooring: Calgary, Penang or Metro styles in any three (3) colours to be selected by the Consultant from full line of colours and patterns.
- 2. Thickness: 0.17 in / 0.2 in
- 3. Size:
 - .1 Sheet 98.43 ft x 78.74 in
 - .1 Location: on stair treads & risers of Learning Commons
 - .2 Tile 19.69 in x 19.69 in
 - .1 Location: on main level of Learning Commons
- 4. Warranty: Flooring material and installation shall carry a minimum Manufacturer's ten (10) year commercial warranty.
- 5. Adhesives: Use Manufacturers recommended adhesive. Provide with bid submission all adhesive products SDS. Failure to provide SDS information may result in the rejection of the bid. Spraying of adhesive will not be accepted.
- 6. Installation: All carpet to be installed as per Manufactures instructions (latest editions/amendments) and in accordance with good installation practices.
- 7. Acceptable alternates: similar products may be submitted for consideration during the time of tender.

2.3 ACCESSORIES

- .1 Base:
 - .1 Carpet base: 100 mm high, same material, colour, pattern and texture as adjoining carpet. Vinyl cap strip to accommodate carpet base thickness, colour to match carpet.
- .2 Edging between vertical and horizontal flooring for risers to be Schluter-Schiene in brushed aluminum finish. Ensure edging sizing suits floor material depth. Use longest lengths possible to avoid seams other than where edging changes direction.
- .3 Seaming tape: types recommended by carpet manufacturer for purpose intended.
- .4 Seaming sealer adhesive: type recommended by carpet manufacturer for purpose intended.
- .5 Adhesive:
 - .1 Multi-purpose adhesive type: recommended by carpet manufacturer for direct glue down installation.
 - .2 Pressure sensitive type: recommended by carpet manufacturer for direct glue down installation of modular carpet or speciality backed carpets.
- .6 Concrete floor sealer: to CAN/CGSB-25.20, Type 1.

- .7 Subfloor patching compound: Portland cement base filler, mix with latex and water to form a cementitious paste.

Part 3 Execution

3.1 SUB-FLOOR TREATMENT

- .1 Concrete shall be inspected to determine special care required to make it a suitable foundation for carpet. Cracks 3 mm wide or protrusions over 0.8 mm will be filled and levelled with appropriate and compatible patching compound.
- .2 Do not exceed manufacturer's recommendations for patch thickness.
- .3 Large patch areas are to be primed with a compatible primer.
- .4 Concrete substrates shall be cured, clean and dry.
- .5 Concrete substrates shall be free of paint, dirt, grease, oil, curing or parting agents, and other contaminants, including sealers, that may interfere with the bonding of the adhesive.
- .6 Wherever a powdery or porous concrete surface is encountered, a primer compatible with the adhesive shall be used to provide a suitable surface for glue-down installation.

3.2 PREPARATION

- .1 Prepare floor surfaces in accordance with CRI 104 Standard for Installation of Commercial Carpet.
- .2 Pre-condition carpeting following manufacturer's printed instructions.

3.3 INSTALLATION

- .1 Install flooring using minimum of pieces.
- .2 Install in accordance with manufacturer's printed instructions and in accordance with Carpet and Rug Institute Standard for Installation of Commercial Carpet, CRI 104.
- .3 Finish installation to present smooth wearing surface free from conspicuous seams, burring and other faults.
- .4 Use material from same dye lot. Ensure colour, pattern and texture match within any one visual area. Maintain constant pile direction.
- .5 Hot melt or adhesive seams and cross-joints. Seam edges must be sealed.
- .6 Fit neatly around architectural, mechanical, electrical and telephone outlets, and furniture fittings, around perimeter of rooms into recesses, and around projections.
- .7 Install carpeting to underfloor duct system and to access covers.
- .8 Install carpeting in pan type floor access covers.

- .9 Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

- .10 Install carpet smooth and free of bubbles, puckers, and other defects.

3.4 CARPET TACKSTRIPS AND BINDER BARS

- .1 Install carpet grippers at junctions of walls and vertical surfaces. Secure gripper to prevent movement.
- .2 Install binder bars at exposed carpet edges and centre under doors in door openings.

3.5 DIRECT GLUE DOWN

- .1 Apply adhesive and install flooring in accordance with manufacturer's written instructions, by direct glue-down method.

3.6 SEAMS

- .1 Seal edges of cut-outs with binding method.
- .2 Carpet visibility of seams and joints to acceptable industry standards.

3.7 BASE INSTALLATION

- .1 Install bound edge carpet base to match adjacent carpeting.
- .2 Attach carpet to wall with adhesive. Neatly fit against floor carpet and into cap strip.
- .3 Extend floor carpeting over cove, up wall and into capstrip to form cove carpet base.
- .4 Install resilient base in accordance with Section 09 65 19.

3.8 PROTECTION OF FINISHED WORK

- .1 Vacuum carpets clean immediately after completion of installation. Protect traffic areas.
- .2 Prohibit traffic on carpet for a period of 24 hours until adhesive is cured.
- .3 Install carpet protection to satisfaction of Consultant.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.
- .3 Section 09 22 16 - Non-structural Metal Framing.
- .4 Section 06 10 10 - Rough Carpentry: Wood strapping.
- .5 Section 09 51 13 – Acoustic panel Ceiling.
- .6 Section 04 21 13 – Masonry.
- .7 Section 06 40 00 – Architectural Woodwork.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM C423-09a, Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- .2 Underwriter Laboratories of Canada (ULC)
 - .1 CAN/ULC-S702-09, Thermal Insulation, Mineral Fibre, for Buildings.

1.3 SUBMITTALS

- .1 Product data:
 - .1 Submit duplicate copies of manufacturer's Product data in accordance with Section 01 33 00 indicating:
 - .1 Performance criteria, compliance with appropriate reference standard(s), characteristics, limitations, and trouble-shooting protocol.
 - .2 Product transportation, storage, handling and installation requirements.
- .2 Shop drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 indicating:
 - .1 Elevations, sections, details, materials, dimensions, and finishes.
- .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit one 300 x 300 sample of acoustic panel.
- .4 Certificates: Submit certification from an independent inspection company that panels meet specified design requirements.

- .5 Closeout submittals:
 - .1 Submit following for panels incorporation into Operations and Maintenance Manuals in accordance with Section 01 78 00:
 - .1 Performance criteria and maintenance data.

1.4 QUALITY ASSURANCE

- .1 Installers qualifications: Perform Work of this Section by a company that has a minimum of five years proven experience in the installation of acoustical panel units of a similar size and nature and that is approved by manufacturer. Submit to Consultant, applicator's current certificate of approval by the material manufacturer as proof of compliance.
- .2 Mock-up:
 - .1 Construct one 2 sq. m. mock-up of acoustical panels in location acceptable to Consultant.
 - .2 Arrange for Consultant's review and acceptance, allow 48 hours after acceptance before proceeding with Work.
 - .3 Mock-up may remain as part of Work if accepted by Consultant. Remove and dispose of mock-ups which do not form part of Work.
 - .4 Upon acceptance, mock-up shall serve as a minimum standard of quality for the balance of the work of this Section.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Commence installation after building enclosed and dust generating activities are completed.
- .2 Permit wet work to dry prior to commencement of installation.
- .3 Maintain uniform minimum temperature of 15°C and relative humidity of 20- 40% prior to, during and after installation.

1.6 WASTE MANAGEMENT

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard, packaging material in appropriate on-site bins for recycling.

1.7 EXTRA MATERIALS

- .1 Provide acoustical units for maintenance use amounting to 2% of gross wall area for each pattern and type required for project.
- .2 Provide sufficient adhesive to install extra material provided.
- .3 Extra materials to be from same production run as installed materials.
- .4 Clearly identify each package of acoustical units including colour and type, and each container of adhesive.

- .5 Store where directed by Consultant.

Part 2 Products

2.1 MATERIALS

- .1 General: Provide all components and accessories as required for complete and secure installation including but not limited to strapping, z-clips and fasteners.
- .2 **Type 1: Fabric Acoustic Panels (FAB):**
 - .1 Supply and install surface mounted panels for use at Library.
 - .2 Acoustical construction products must:
 - .1 Not require being labelled as poisonous, corrosive, flammable or explosive under the Consumer Chemical and Container Regulations of the Hazardous Products Act.
 - .2 Be accompanied by detailed instructions for proper handling and installation so as to minimize health concerns.
 - .3 Composition: Fiberglass with resin-hardened edges with 25% recycled content.
 - .4 Panels shall be square edged with mechanical butt joints. A Flame Spread rating shall not exceed 25 and NRC-0.80 in accordance with ASTM C423.
 - .5 Colour: Colours shall be selected by Consultant from Manufacturer's standard colour range.
 - .6 Panel size: As selected by the Consultant.
 - .7 Mounting method: Z-clips.
 - .8 Acoustic Insulation: CAN/ULC S702; 63 mm thick acoustic insulation "Fiberglass Noise Stop Blanket".
 - .9 Screws: Non corrosive finish, type recommended by acoustic unit manufacturer.
 - .10 'Custom Soundsoak' by Armstrong (Contact: Ruth Shannon) or acceptable alternatives by Decoustics or approved alternative manufacturer including Wallworks, Fabri-Lok Tensioned Fabric System (Contact Darcey Jerrom 877 829-2550 Ext. 35).

2.2 FABRICATION

- .1 Verify dimensions of existing Work before commencing fabrications and report discrepancies to Consultant.
- .2 Fabricate Work in accordance with Contract Drawings and reviewed shop drawings. Fabricate, fit and assemble Work in shop where possible. Where shop fabrication is not possible, make trial assembly in shop.
- .3 Fabricate Work free from defects impairing function, appearance, strength and durability.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine carefully surfaces to which panels will be attached and report defects to the Architect. Commencement of installation will signify complete acceptance of substrate.

3.2 INSTALLATION OF FABRIC ACOUSTIC PANELS

1. Install panels, support and anchoring system, fasteners, trim and related items to lines and elevations indicated and in strict accordance with reviewed shop/erection drawings and manufacturer's printed instructions. Carefully co-ordinate work with other Sections.
2. Install acoustic insulation to suitable friction fit between channels.
3. Z-Girts: Install girt/support system true and plumb in order to provide proper support for wall.
4. Insulation:
 - .1 Install thermal insulation in longest panel sizes possible in accordance with manufacturer's instructions.
 - .2 Butt insulation with moderate contact and, cut and fit them tightly around other construction elements.
5. Fasten panels with screws where screw heads are to be flush with panel surface.
6. Damaged panels, waviness, warp or distortion of finished work will not be accepted.

3.3 INSTALLATION OF PAINTED SOLID BOARD PANELS

1. Fasten metal furring channels to wall at 600 mm O.C. and at perimeter to receive panels, insulation and wood trim. Refer to detail drawings.
2. Install acoustic insulation to suitable friction fit between channels.
3. Fasten panels, long dimension to the vertical, to furring using suitable self tapping screws at maximum 300 mm O.C.
4. Install wood surround trim. Refer to Section 06 40 00.

3.4 INSTALLATION METAL PANELS

1. Fasten zee clips to wall-shim, as required, for level and even appearance.
2. Install insulated panels on clips. Provide vandal resistant fastening and metal trim.

3.5 CLEANING

- .1 Keep acoustic installation and all components clean. Remove blemishes immediately.

3.6 PROTECTION

- .1 Use cardboard to protect finished acoustical wall treatment from damage.
- .2 Remove prior to substantial completion.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 06 40 00 - Architectural Woodwork.
- .3 Section 05 12 23 – Structural Steel for Buildings.
- .4 Section 05 50 00 – Metal Fabrications.
- .5 Section 08 11 14 – Metal Doors and Frames.
- .6 Section 09 91 27 – Finish and Colour Notes.
- .7 Section 09 91 30 – Door and Room Finish Schedule.

1.2 REFERENCES

- .1 Architectural Painting Specifications Manual, Master Painters Institute (MPI).

1.3 WARRANTY

- .1 Upon completion of the work, contractor shall warrant that the work has been performed with respect to the standards and requirements incorporated in the MPI specification manual-latest edition.

1.4 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

- .1 Do not apply paint finish in areas where dust is being generated.
- .2 Conform to requirements of MPI Manual.
- .3 Comply with the requirements of Section 01 35 30- Health and Safety.

1.5 JOB MOCK-UP

- .1 Complete a mock-up room to be reviewed and approved by School Board and Consultant for approval on application of block filler and finish paint coats.

1.6 SCHEDULING OF WORK

- .1 Submit work schedule for various stages of painting to Consultant for approval. Submit schedule minimum of 72 hours in advance of proposed operations.
- .2 Obtain written authorization from Consultant for any changes in work schedule.
- .3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.7 EXTRA MATERIALS

- .1 Submit one - four litre can of each type and colour of primer, stain and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
- .2 Deliver to Contractor and store where directed.

1.8 DELIVERY, HANDLING AND STORAGE

- .1 Labels shall clearly indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .2 Remove damaged, opened and rejected materials from site.
- .3 Provide and maintain dry, temperature controlled, secure storage.
- .4 Observe manufacturer's recommendations for storage and handling.
- .5 Store materials and supplies away from heat generating devices.
- .6 Store materials and equipment in a well ventilated area with temperature range 7°C to 30°C.
- .7 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .8 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Consultant. After completion of operations, return areas to clean condition to approval of Consultant.
- .9 Remove paint materials from storage only in quantities required for same day use.
- .10 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .11 Fire Safety Requirements:
 - .1 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.9 FINISHES AND COLOURS

- .1 Review the requirements outlined in Section 099127, Finish Schedule and Colour Notes. A separate colour schedule will be issued after contract award.

- .2 Allow for 10 colours total from all formulations for this project including room wall accent colours.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.,) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .2 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .3 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .4 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground the following procedures shall be strictly adhered to:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .5 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .6 Set aside and protect surplus and uncontaminated finish materials: galvanized touch up; wood stain, prefinished metal touch up paint. Deliver to or arrange collection by recycling organization for verifiable re-use or re-manufacturing.
- .7 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

Part 2 Products

2.1 MATERIALS

- .1 Acceptable Manufacturer's: Where MPI code numbers are not referenced, use Products from one of the following manufacturers:
 - .1 Benjamin Moore & Co. Ltd.
 - .2 Canadian Industries Ltd.
 - .3 ICI (Glidden) Paints.
 - .4 Para Paints.

- .5 Pratt & Lambert Inc.
- .6 SICO Coatings.
- .7 The Sherwin-Williams Company.
- .2 Manufacturers of intumescent coatings having Product considered acceptable for use:
 - .1 A/D Fire Protection Systems Inc.
 - .2 Carboline.
- .3 Paint materials for paint systems shall be products of a single manufacturer.
- .4 Acceptable products: Per MPI Manual and as listed.
- .5 Paint materials for each paint system to be products of a single manufacturer.
- .6 Use low-VOC and low-odour paints only.

Part 3 Execution

3.1 GENERAL

- .1 Prepare surfaces to receive paint per MPI Manual.

3.2 APPLICATION

- .1 Sand and dust between each coat to remove defects visible from distance up to 1.5 m.
- .2 Finish closets and alcoves as specified for adjoining rooms.
- .3 Apply each coat at the proper consistency. Each coat of finish should be fully dry and hard before applying the next coat, unless the manufacturer's instructions state otherwise.
- .4 Method of application to be as approved by Consultant. Apply paint as recommended by manufacturer. Conform to manufacturer's application instructions unless specified otherwise.
- .5 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Consultant.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .6 Spray application:

- .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
- .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
- .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
- .4 Brush out immediately all runs and sags.
- .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .7 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Consultant.
- .8 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .9 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .10 Sand and dust between coats to remove visible defects.
- .11 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .12 Finish inside of cupboards and cabinets as specified for outside surfaces.
- .13 Finish closets and alcoves as specified for adjoining rooms.
- .14 Finish top, bottom, edges and cut-outs of doors after fitting as specified for door surfaces.

3.3 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Refer also to Finish Notes in Section 099127- Finish and Colour Notes.
- .2 Paint exposed conduits, pipes, hangers and other mechanical and electrical equipment occurring in finished areas as well as inside cupboards and cabinet work. Colour and texture to match adjacent surfaces, except as noted otherwise. Coordinate with mechanical trades applying banding and labeling after pipes have been painted. Do not paint white PVC covers on exposed mechanical water, drain and other lines
- .3 Paint gas piping standard yellow where visible on roof or in service spaces. Do not paint gas meter or gas equipment in wall niche yellow—colour to later selection by Architect.
- .4 Paint surfaces inside of ductwork and elsewhere behind grilles where visible using primer and one coat of matte black paint.
- .5 Paint both sides and edges of plywood backboards for equipment before installation.
- .6 Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

3.4 PAINT SYSTEMS

- .1 System references listed are based on Chapters 4A and 4B of MPI Manual and are MPI Premium Grade, unless noted otherwise.

3.5 INTERIOR FINISHES

- .1 Wood, where applicable:
 - .1 Miscellaneous trim: INT. 1-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .2 Wood slat ceiling to Foyer 102: INT. 1-J Premium Grade; satin finish, Fire Retardent. Slats to be sealed and shop finished prior to installation. Refer also to Section 064000.
 - .3 Casework and miscellaneous wood items:
 - .1 Exterior surfaces: INT. 1-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .2 Interior surfaces: INT. 1-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .3 Wood Benches and Upper Shelves: INT. 2-F, Stained Alkyd Satin Finish, Premium Grade.
 - .4 Gym Storage Shelves: INT. 3-A, Stain Finish, Custom Grade
 - .2 Gypsum board: INT.4-B, Latex Eggshell Finish, Premium Grade.
 - .3 Acoustical wall panels: INT. 6-A, Latex Flat Finish, Custom Grade.
 - .4 Concrete Block: INT.8-C -modified; Latex Semi-Gloss Finish, Premium Grade. Modified system refers to all work where 2 full coats of block filler shall be applied.
 - .5 Concrete Block (P-GF): Two-coats of 100% zero VOC epoxy, Premium Grade - shown on Room Finish Schedule as P-GF (Paint - Gloss) finish.
 - .6 Concrete Floors (S.CONC); refer to Section 033505 - Concrete Floor Hardeners and Sealers for liquid sealer.
 - .7 Exposed Cast in Place Concrete ceilings: INT. 8-A, Latex Flat Finish, Premium Grade
 - .8 Exposed Precast Concrete ceilings: INT. 8-A, Latex Flat Finish, Custom Grade
 - .9 Miscellaneous metal:
 - .1 Primed: INT. 12-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .2 Galvanized: INT. 13-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .3 INT. 12-G, Water based Epoxy finish, two coats on a rust inhibitive primer for all exposed steel for all exposed steel on stairs and landings including stringers, pickets and guard railings.
 - .10 Galvanized metal: INT. 13-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .11 Hollow Metal Doors and Frames: Without exception, all wipecoated Galvanized Hollow Metal Doors, Frames and Screens, interior and exterior shall be field cleaned with solvent, galvanized prime paint coated and then finished with INT. 13-A Premium Grade, Gloss Finish. Base coat primer shall be submitted for review in advance or door/frame painting shall be rejected by Consultant. For exterior hollow metal frames, if any,

adjacent to aluminum windows, provide finish coat as an exterior premium grade metallic gloss finish to match anodized windows or Aluminum Composite panels. Colour to be confirmed by Architect during construction.

.12 Gymnasium Painting:

- .1 note that painting of gymnasium acoustic deck and structural steel is part of painting contract.
- .2 Allow for single colour for deck and joists.
- .3 Allow for complete painting of all hangers and equipment brackets including but not limited to basket ball baskstops, electrical pipe rails, mechanical equipment fan cages, etc.
- .4 Allow for accent painting of 2 perimeter stripes to all walls and over proscenium, shown on drawings. Total of 2 accent colours for these stripes.

.13 Other Painting:

- .1 Painting of Elevator/Lift doors and frame is part of this contract, unless stainless steel.
- .2 In the following rooms with exposed metal deck including mechanical rooms and storage rooms:
 - .1 Allow for single colour for deck and joists.
 - .2 Allow for complete painting of all hangers and equipment brackets including but not limited to, electrical and mechanical equipment, etc.
 - .3 painting deck/floor slab and structural steel is part of painting contract.

.14 Stage Painting:

- .1 Paint all walls, ceiling, structure, ductwork etc. in Stage area flat black paint.

3.6 EXTERIOR PAINTING

- .1 Pavement markings: EXT. 7-A, Zone Marking Alkyd Finish, Premium Grade.
- .2 Steel columns at front entrance: EXT. 6F, Two component epoxy finish, Premium Grade.
- .3 Miscellaneous metal:
 - .1 Primed: EXT. 11-A-Gloss, Premium Grade
 - .2 Galvanized: Touch up any welds, cuts or damage with 'Galvafroid' Paint by W.R. Meadows prior to prime and finish coats.; Finish System EXT. 12-A-Gloss, Premium Grade
- .4 Galvanized Structural Steel: Touch up any welds, cuts or damage with 'Galvafroid' Paint by W.R. Meadows prior to prime and finish coats.; Finish System: EXT. 12-A-Gloss, Premium Grade.
- .5 Steel - high heat: EXT. 15-A
- .6 Paint exterior vents and louvres located in masonry to match adjacent masonry in colour.

3.7 INSPECTIONS

- .1 Provide Architect with all formulations at outset of project.
- .2 Provide inspections by representative of the Master Painters Institute (MPI) in compliance with the terms of the Canadian Painting Contractors Association Inspection and Guarantee Program.
- .3 Cooperate at all times with the paint inspection agency in the performance of their duties as required as part of the work of this Section.
- .4 MPI inspection costs to be paid from Cash Allowance.

END OF SECTION

Part 1 General

1.1 GENERAL FINISH NOTES

- .1 The Material and Colour Schedule will be issued by the Consultant after tender. It shall be read in conjunction with the Drawings, Specifications, Room Schedule and Door Schedule. Colour and material references named will be based on one manufacturer, as carried by the Contractor or, in the case that no specific manufacturer is carried, based on the Consultant's choice.
- .2 Approved alternative manufacturers will be acceptable only as indicated in the specifications. However, approved alternate products submitted must match the products named in the Specification to the Consultant's selection. Alternate products other than those named in the specifications will not be allowed unless previously approved by the Consultant.
- .3 Consult Consultant prior to painting any surface not included in the formulae as listed.
- .4 Final colour for exterior painted surfaces and prominent interior areas shall be approved on the job site by the Consultant.
- .5 Paint samples: Contractor to submit paint samples for all areas required to "Match Adjacent Finish".
- .6 All similar paint formulations are to be identical when dry. Variations in tone, texture or sheen shall not be accepted.
- .7 Submit two 300 mm x 300 mm paint samples of each colour required for approval by the Architect.
- .8 Exact locations of accent paint called for in the Material and Colour Schedule, to be issued after Contract award, not specifically identified on the drawings are to be verified on site with the Consultant.

1.2 EXTERIOR FINISH NOTES

- .1 All exposed metal (doors, frames, lintels, stairs, handrails, mechanical equipment, etc.) to be painted except for prefinished metal louvres, stainless steel, and aluminum. Mechanical equipment is to be painted whether delivered to the site prepainted or not (exhaust fans, goosenecks, exhaust stacks, supports, HVAC units, HRU units, etc.). Colours to match adjacent material-generally either to match brick or tan to match flashing or siding material. Do not paint exposed white PVC pipe covers on interior. Architect will advise on jobsite which other items mentioned above, if any, do not require painting.
- .2 All unfinished metal work provided by landscaping is to be painted by Section 099122-Painting.

1.3 INTERIOR FINISH NOTES

- .1 All heating units, recessed convectors, grilles, pipes, access panels, hangers and miscellaneous exposed metal work (except stainless steel or anodized aluminum) to be painted to match the surfaces on which they occur unless noted otherwise on the colour schedule, prefinished in suitable colour or directed by the Consultant. If prefinished equipment is damaged, it shall be re-painted. Painting to be by formulations specified in Section 09 91 12- Painting.
- .2 All interior fitments, casework, millwork, etc. to be melamine unless otherwise noted. Refer to Sections for specific requirements regarding materials, construction, finishes and hardware. Note that drawer and cupboard interiors are to be considered as exposed surfaces and will therefore be finished.
- .3 Do not paint over nameplates, identification tags, etc.
- .4 Make good all existing surfaces and finishes that are damaged during construction.

END OF SECTION

ROOM FINISH SCHEDULE

ROOM FINISH SCHEDULE		FLOOR		WALL		CEILING			REMARKS
NO.	NAME	FIN.	BASE	MAT'L	FIN.	MAT'L	FIN.	HEIGHT(mm)	
GROUND FLOOR									
X103A	GYM STORAGE	EX.	EX.	EX.CB	P	EXPOSED	P	-	
X126B	COAT ROOM	POR	POR	EX. CB/CB	P	LAP		2961	
X131	KINDERGARTEN	SF	RR	EX. CB/CB	P	LAP		2743	
X132	RESOURCE ROOM	LVT	RR	EX.CB./CB	P	LAP		2438	
X133	MECHANICAL	EX.	EX.	EX.CB	P	EX.	P	-	
X140	SUPPLIES AND RECEIVING	EX.	EX.	EX.CB	P	EXPOSED	P	-	
X140A	CUSTODIAL OFFICE	LVT	RR	EX.CB/CB	P	EXPOSED	P	-	
X140B	ELECTRICAL	EX.	EX.	EX.CB	P	EXPOSED	P	-	
A140C	ELECTRICAL	EX.	EX.	EX.CB/CB	P	EXPOSED	P	-	
X141	CLASSROOM	EX.	EX.RR/RR	EX.CB/CB	P	EXIST./LAP		2810	REMOVE PORTION OF LAP FOR MECH. INSTALL ABOVE CEILING. REPLACE LAP AS REQUIRED.
X142	CORRIDOR	POR	POR	EX. CB	P	LAP		2440	POR. AT TIE-IN TO ADDITION
X144	SPRINKLER	S.CONC.	RR	CB	P	EXPOSED	P	-	
141	WASHROOM	POR	POR	CB	CWT	GB	P	2438	CWT FLOOR TO CEILING
100	VESTIBULE	POR	POR	CB	CWT	LAP		2810	CWT FLOOR TO CEILING
102	OFFICE	CPT	RR	CB	P	LAP		2810	
103	STAFF ROOM	LVT	RR	CB	P	LAP		2810	
104	KITCHEN	POR	POR	CB	P	LAP		2810	CWT BACKSPLASH
104A	WALK-IN PANTRY	POR	POR	CB	P	LAP		2610	
105	B/F WASHROOM	POR	POR	CB	CWT	GB	P	2610	CWT FLOOR TO CEILING
106	LAUNDRY	POR	POR	CB	P	LAP		2610	
107	CUST./MECH.	S.CONC.	RR	CB	P	EXPOSED	P	-	
108	STROLLER STORAGE	LVT	RR	CB	P	LAP		2810	
109	INFANT	SF	RR	CB	P	LAP		2710	
109A	STORAGE	LVT	RR	CB	P	LAP		2810	
109B	WASHROOM	POR	POR	CB	CWT	GB	P	2710	CWT FLOOR TO CEILING
109C	SLEEPING	SF	RR	CB	P	LAP		2710	

ROOM FINISH SCHEDULE

ROOM FINISH SCHEDULE		FLOOR		WALL		CEILING			REMARKS
NO.	NAME	FIN.	BASE	MAT'L	FIN.	MAT'L	FIN.	HEIGHT(mm)	
110	TODDLER	SF	RR	CB	P	LAP		2710	PAINT STRUCTURE INCL. MECH. DUCTS, SUPPORTS, CONDUITS ETC. REFER TO INT. ELEVATION
110A	WASHROOM	POR	POR	CB	CWT	GB	P	2610	CWT FLOOR TO CEILING
111	TODDLER	SF	RR	CB	P	LAP		2710	
111A	WASHROOM	POR	POR	CB	CWT	GB	P	2610	CWT FLOOR TO CEILING
111B	STORAGE	LVT	RR	CB	P	LAP		2610	
111C	VESTIBULE	POR	POR	CB	P	LAP		2710	
112	PRESCHOOL	SF	RR	CB	P	LAP		2710	
112A	WASHROOM	POR	POR	CB	CWT	GB	P	2610	CWT FLOOR TO CEILING
113	PRESCHOOL	SF	RR	CB	P	LAP		2710	
113A	WASHROOM	POR	POR	CB	CWT	GB	P	2610	CWT FLOOR TO CEILING
113B	VESTIBULE	POR	POR	CB	P	LAP		2710	
114	CORRIDOR	POR	POR	CB	P	LAP		2610	
F1	STAIR F	POR	POR	CB	P	LAP/GB	P	VARIES	REFER TO RCP. POR ON TREADS & RISERS C/W ANTI-SLIP COLOUR CONTRASTING NOSING. TACTILE INDICATOR STRIP AT TOP OF LANDING.
SECOND FLOOR									
X210	CLASSROOM	LVT	RR	CB	P	LAP		2810	
X211	CUSTODIAL	LVT	RR	CB	P	EXPOSED	P		
X212	CORRIDOR	POR	POR	CB	P	LAP		2610	
200	LEARNING COMMONS	CPT	RR	CB	P/FAB	LAP/GB		4010/2400	
201	ELECTRICAL ROOM	S.CONC	RR	CB	P	EXPOSED	P	-	PAINT STRUCTURE INCL. MECH. DUCTS, SUPPORTS, CONDUITS ETC. REFER TO INT. ELEVATION & RCP

ROOM FINISH SCHEDULE

ROOM FINISH SCHEDULE		FLOOR		WALL		CEILING			REMARKS
NO.	NAME	FIN.	BASE	MAT'L	FIN.	MAT'L	FIN.	HEIGHT(mm)	
202	SEMINAR	LVT	RR	CB	P	LAP		2810	
203	STAFF RESOURCE ROOM	LVT	RR	CB	P	LAP		2810	
203A	STORAGE	LVT	RR	CB	P	LAP		2810	
204A	GIRLS W/R	POR	POR	CB	CWT	GB	P	2610	CWT FLOOR TO CEILING
204B	BOYS W/R	POR	POR	CB	CWT	GB	P	2610	CWT FLOOR TO CEILING
205	RESOURCE	LVT	RR	CB	P	LAP		2810	
206	CLASSROOM	LVT	RR	CB	P	LAP		2810	
207	CLASSROOM	LVT	RR	CB	P	LAP		2810	
208	CLASSROOM	LVT	RR	CB	P	LAP		2810	
209	CLASSROOM	LVT	RR	CB	P	LAP		2810	
210	CLASSROOM	LVT	RR	CB	P	LAP		2810	
211	CLASSROOM	LVT	RR	CB	P	LAP		2810	
212	CORRIDOR	POR	POR	CB	P	LAP		2810	
213	BF WASHROOM	POR	POR	CB	CWT	GB	P	2810	CWT FLOOR TO CEILING
F2	STAIR F2	POR	POR	CB	P	LAP		2810	REFER TO RCP. POR ON TREADS & RISERS C/W ANTI-SLIP COLOUR CONTRASTING NOSING. TACTILE INDICATOR STRIP AT TOP OF LANDING.

PART 1 - GENERAL

1.1 General Notes

1. Find the **Room Finish Schedule** on the following pages
2. **This schedule MUST be read in conjunction with a complete set of drawings** to ascertain all details and finished surfaces that may not be listed on the schedule.
3. Refer to interior elevations, plans sections and reflected ceiling plans to coordinate finish notes and extents of materials.
4. Refer to various specifications sections for different types of materials including, but not limited to:
 - .1 flooring materials such as resilient tile
 - .2 ceiling materials such as Lay-In Acoustical panel (LAP)
 - .3 Acoustical wall treatment
5. Abbreviations Legend:

<u>Code</u>	<u>Reference</u>
ASD	Acoustic Steel Deck
CMT	Porcelain Mosaic Floor Tile
CPT	Carpet Tile
CW	Curtain Wall
CWT	Ceramic Wall Tile
CB	Concrete Block
GWB	Gypsum Board
HAP	Hanging Acoustic Panels
LAP	Lay-in Acoustic Panel
LVT	Luxury Vinyl Tile
P-GF	Paint - Gloss Finish
POR	Porcelain Tile
P	Paint
RR	Resilient Rubber
RSTR	Rubber Stair Tread & Riser
S.CONC	Sealed Concrete (refer to Section 03 35 05)
SF	Resilient Sheet Flooring
SF-Sp	Resilient Sheet Flooring - Sport
VCT	Vinyl Composite Tile
WRGB	Water-Resistant Gypsum Board

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.

1.2 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site packaging materials at appropriate recycling facilities.
- .2 Dispose of recyclable packaging material in appropriate on-site bin for recycling.

Part 2 Products

2.1 MATERIALS

- .1 Tack Boards (TB) - As manufactured by Architectural School Products, Mississauga; natural coloured cork tackboard:
 - .1 single layer cork sheet 6 mm thick; natural color, on 6 mm particle board to CAN 3.188.1-M78, Grade R.
 - .2 Extruded aluminum trim No. 205, 1.5 mm wall thickness, mitered, clear anodized finish
 - .3 Concealed steel fastenings (1 coat CGSB 1-GP-81e baked primer) to toggle bolts. Do not fasten to wall with adhesive.
 - .4 Size: Refer to drawings.
 - .5 Acceptable alternates: Global or Martack Specialties Limited.
- .2 White Boards (WB) - “Vit-Rite: Rite on, Wipe off” model as manufactured by Architectural School Products, Mississauga.
 - .1 Color: White.

- .2 Accessories: Flush trim No. 205, chalk/marker tray No. 212, 89 mm deep, minimum, Display Rail No. 200, KWIK Grip with tack strip.
- .3 Provide all hardware and fasteners suitable for secure recessed mounting.
- .4 Size, as per drawings.
- .5 Acceptable alternates: Global or Martack Specialties Limited.
- .3 WhiteBoard, Recessed (WB-R) - "Vitrite" model as Manufactured by Architectural School Products, Mississauga;
 - .1 Colour: White. Flush trim No. 405 and flush chalk tray No. 461.
 - .2 Provide all hardware and fasteners suitable for secure recessed mounting.
 - .3 Size as per drawings.
 - .4 Acceptable alternates: Global or Martack Specialties Limited.
 - .5 Quantity: 1: Location: General Purpose Room 161.
- .4 Coat racks and shelves (student):
 - .1 Model STL 1001 as manufactured by Architectural School Products, Mississauga.
 - .2 Standard arrangement of 2 ABS hooks per 1'-0" arranged on alternate bars of shelf units.
 - .3 Colours: single colour frame with contrasting coloured hooks to later selection by Architect.
 - .4 Acceptable alternates: Global School Products or Martack Specialties Limited.
 - .5 Locations: Throughout school in corridors.
 - .6 Coat Racks to be mounted at 1200mm a.f.f. to hooks at ground floor locations, and at 1425mm a.f.f. to hooks at second floor locations."
- .5 Coat rod and hooks:
 - .1 Student line Model STL 75 as manufactured by Architectural School Products, Mississauga. Mounted to underside of cubbies. Refer to AD drawings for locations.
- .6 Coat racks and shelves (closets):
 - .1 Student line Model STL 2001 as manufactured by Architectural School Products, Mississauga. Location: closets designated as CR&S on drawings
- .7 Safety Release Coat Hook:
 - .1 High strength polycarbonate coat hook with safety release weight under downward pressure to not exceed 12 kg (26 lbs.)
 - .2 Supply all suitable mounting hardware for a vandal proof, secure installation using stainless steel sleeve bolts on partition doors or panels. Do not supply standard Robertson or Phillips head screws.
 - .3 Colours: Allow for three (3) colours from Manufacturers standard line
 - .4 Acceptable Materials: "HenkelHook" as manufactured/distributed by Henkel Diversified Inc, London ON, tel (519) 641-5872.
 - .5 Alternate Acceptable product by "Frost" distributed by Architectural School Products.
 - .6 Locations:

- .1 Coat hooks to be mounted in ALL barrier free washrooms and shall be safety release style and mounted on the side wall
- .2 Kindergarten Cubbie Areas as described on AD drawings in Binder C. Refer to interior elevations for quantity.
- .3 Gym Change Rooms above benches.
- .7 Samples: submit test data and samples for review as specified in Section 013330 – Submittal Procedures.
- .8 Exterior Semi-Recessed (Buried) Garbage Container
 - .1 EarthBin front loader truck collected, semi-recessed Garbage containers as manufactured by EarthBin,
 - .2 Capacity: 6.5 cubic yard (5m³) each.
 - .3 Lids:
 - .1 Standard Garbage, square opening lid for one unit. Black.
 - .2 Large Carboard Slot for second unit. Blue.
 - .4 Framing panel colour: cedar
 - .5 Include excavation, supply and install of units.
 - .6 Location: 2 units; refer to Site Drawing.
 - .7 Acceptable alternates meeting or exceeding the above specifications. Must be front loader truck collected units.
 - .8 Refer to Site Plan drawing.
- .9 Fire Safety Plan Lock Box: steel, surface mounted, prefinished white with text “Fire Safety Plan”. Approx. 330mm x 330mm x 100mm (13" x 13" x 4"). Location: Main Entrance Vestibule.
 - .1 As supplied by National Fire Equipment Ltd. or Fire Plan Supply
- .10 Change Table with integrated sink:
 - .1 Change table with sink, manufactured by Totmate.
 - .2 Model 8543A, Maple finish, right handed.
 - .3 Include pull-out for walk-up.
 - .4 Location & Quantity: two (1) total: 1 in Infant Washroom and 1 in Toddler/Pre-School Washroom.
- .15 Ladder:
 - .1 Ladder with Safety Post & Cage: Provide prefabricated fixed ladder with safety post and safety cage.
 - .2 Safety Post to be Bilco ladder UP or approved alternate.
 - .3 Safety Cage as manufactured by ProBel, Skyline Group, Portable Pipe Hanger or approved alternate.
 - .4 Provide guardrail around opening.
 - .5 Size to suit site conditions and comply with safety regulations.
 - .6 Refer to AD drawings.
 - .7 Quantity: 1 Ladder and Cage only at Exterior. Refer to Roof Plan
- .16 Open Metal Shelving Units

Product: Dexion by Redirack, or similar system by E-Z-Rect, Triple-A, North American “Easy-Up 5000 Shelving or approved equivalent product.

- .1 Typical shelf unit: 915 mm w X 2200 mm h X 600 mm deep; seven shelves high, including top and bottom.
 - .2 Provide a total of 2 units.
 - .3 Location: Final locations to be coordinated with Consultant.
 - .4 <https://atwork.ca/shop/filing-storage/shelving/metalware-metal-shelving/>
- .17 Dishwasher
- .1 Product: Hobart LXEH-1 Undercounter Dishwasher with hot water sanitation.
 - .2 Location: Childcare
 - .3 Quantity: 1

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

- .1 Install where indicated on drawings and as per manufacturer's instructions.

3.3 DEMONSTRATION AND TRAINING

- .1 Provide demonstration of operation to the Owner and his representatives.
- .2 Provide training for operation, maintenance and repairs.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean surfaces after installation using manufacturer's recommended cleaning procedures.
- .3 Clean aluminum with damp rag and approved non-abrasive cleaner.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED WORK

- .1 Section 01 33 00 - Submittal Procedures.

1.2 WORK INCLUDED

- .1 Supply and install exterior signage as specified and listed. All signage may not be shown on the drawings.
- .2 Supervision, inspection and checking of signage as installed on site.

1.3 REFERENCES

- .1 All fire route signage to be fabricated in strict accordance with the signage standard of the Municipality where the site is located. All other exterior signage such as stop signs, one-way signs, do not enter signs, etc., shall be to M.O.T. standard.
- .2 Aluminum Association, Inc. (AA)
 - .1 Designation System for Aluminum Finishes.
- .3 American Society for Testing and Materials (ASTM)
 - .1 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated, (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM B32, Standard Specification for Solder Metal.
 - .3 ASTM B456, Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.81, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
 - .2 CAN/CGSB-1.88, Gloss Alkyd Enamel, Air Drying and Baking.
 - .3 CGSB 31-GP-107Ma, Non-Inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.
 - .4 CGSB 41-GP-6M, Sheets, Thermosetting Polyester Plastics, Glass Fibre Reinforced. Reaffirmation of September 1976.
- .5 Canadian Standards Association (CSA)
 - .1 CAN/CSA-G164-, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .2 CSAW47.2, Certification of Companies for Fusion Welding of Aluminum.
 - .3 CSA W59, Welded Steel Construction (Metal Arc Welding) (Imperial Version).
 - .4 CSA W59.2, Welded Aluminum Construction.
- .6 Canadian Sheet Steel Building Institute (CSSBI)
 - .1 Sheet Steel Facts # 6, Metallic Coated Sheet Steel for Structural Building Products.

- .7 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

1.5 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

1.6 QUALITY ASSURANCE

- .1 Welding Certification in accordance with CSA W47.2.

1.7 SIGNAGE LIST

- .1 A full Signage list is included with this document for the Tender of Signage.

1.8 GUARANTEE

- .1 Submit a written Guarantee to the Board, that all work of this Tender shall be free from defects in workmanship and materials for a minimum period of one (1) year from date of approved completion.
- .2 All defects (excluding vandalism) in materials and workmanship that become apparent during the Guarantee period shall be made good or material replaced at no cost to the Board.

1.9 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal packaging material in appropriate on-site bins for recycling.
- .3 Place materials defined as hazardous or toxic in designated containers.
- .4 Divert unused materials from landfill to metal recycling facility as approved by Consultant.
- .5 Unused paint or coating material must be disposed of at an official hazardous material collections site as approved by Consultant.
- .6 Fold up metal banding, flatten and place in designated area for recycling.
- .7 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in any other location where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

- .1 Aluminum extrusions: to designation AA 6063-T5 and AA 6006-T5.
- .2 Sheet aluminum: anodizing quality.
- .3 Prefinished sheet steel: conforming to CSSBI - Sheet Steel Facts #6: for normal environment: in colours selected from manufacturer's standard range.
- .4 Galvanized steel sheet to ASTM A653/A653M: Commercial Quality.
- .5 Welding materials: to CSA W59.
- .6 Solder: to ASTM B32, Type Sn50.
- .7 Self-stick foam tape: 2.4 mm thick, 352.4 Kg/m³ density polyurethane open-cell foam tape for sign purposes, with synthetic self-stick adhesive on both sides. Width: to suit sign sizes.
- .8 Acrylic top-coat: clear, non-yellowing, exterior grade, satin finish, acrylic polyester resin protective coating, compatible with metal surface of type recommended by sheet manufacturer.
- .9 Bituminous paint: to MPI EXT 5.4D.
- .10 Mounting Hardware:
 - .1 Furnish all signage with the necessary screws, bolts, and other fasteners of suitable size and type, to anchor signage into position for long life under hard use.
 - .2 Exterior Fire route and School signs shall be permanently mounted on a strong flanged hot dipped rolled high tensile galvanized steel U-Channel posts. These posts are to have 10mm (3/8") dia. Holes spaced 25mm (1") on centre for easy sign mounting. Signs to be mounted to flanged side of post. All exterior signs are to come completed with galvanized steel mounting hardware, necessary to properly mount sign for exterior use. Fire route sign FR-6 when required is to be installed at a 45 degree angle in relation to the edge of the traveled portion of the designated fire route facing approaching traffic. Fire route signs FR-7 and FR-8 when required are to be installed at a 90 degree angle in relation to the edge of the traveled portion of the designated fire route, in such manner as to allow both sign faces to be visible to traffic, or as listed otherwise. Fire route sign FR-9 when required is to be installed at a 90-degree angle to the edge of the traveled portion of the designated fire route. Notwithstanding what is stated here in 2.1.2, all signage must comply with the latest by-laws in the Municipalities applicable to the work.
- .11 School Name and Address:
 - .1 CASH ALLOWANCE
 - .2 Cast aluminum, Duracron finish, Neutra font.

- .3 Letters: for school name line 1: Upper case, 300 mm high x 13 mm return
- .4 Letters: for school name line 2: Upper case, 200 mm high x 10 mm return.
- .5 Letters for address: Upper case, 150 mm high x 10 mm return.
- .6 Wording as shown on elevation drawing: school name to be confirmed prior to ordering.

- .12 School Board Panel Sign:
 - .1 CASH ALLOWANCE
 - .2 950mm high x 2438 wide satin aluminum panel sign.
 - .3 Black vinyl or silkscreen graphic of school board logo.
 - .4 To be mounted using welded boses and stainless steel studs and spaced a minimum of 6mm from face of exterior wall.

- .13 U-Posts:
 - .1 Hot dipped rolled light temple galvanized steel
 - .2 Type: Flanged, 10 mm 0 holes @ 25 mm.o.c.
 - .3 Height: 3658 mm overall

- .14 Free Standing Posts:
 - .1 Material: 25 mm x 25 mm galvanized steel hollow sections, primed + 2 coats exterior grade enamel
 - .2 Base: 100lb weight concrete base.
 - .3 Modified height: bottom of base to top of port: 15 25 mm

- .15 Exterior Traffic Signs:
 - .1 Material: Aluminum
 - .2 Letters: Refer to style detail
 - .3 Mounting height: 2.0 to bottom of sign

2.2 SIGNAGE LIST

- .1 All styles, quantities and location to be confirmed prior to ordering. Refer to site plans for quantity and locations.

- .2 “Stop” Signs:
 - .1 600 m x 600 m, red background, white lettering, white border.
 - .2 Quantity: refer to drawings.

- .3 “Barrier-Free Parking” Signs:
 - .1 300 mm x 635mm white background, black border and letters, blue handicapped symbols and border, red circle and diagonal bar
 - .2 Quantity: refer to drawings
 - .3 Mounted on U-posts.

- .4 “Visitor Parking” Signs:
 - .1 Quantity: refer to drawings if required

- .5 “School Bus Loading Only - No Parking 7:30am – 4:30pm” Signs:
 - .1 300mm x460 mm white background, black border and lettering, black arrow
 - .2 3 required (1 arrow left, 1 arrow left/right, 1 arrow right)
 - .3 3 mounted on freestanding posts adjacent to bus lane
- .6 “Fire Department Connection” Signs:
 - .1 300mm x 450 mm, red background, white letters and borders
 - .2 Refer to drawings if required
 - .3 Mount on building at Fire Department Connection
- .7 “Fire Route” Signs:
 - .1 As per Municipal standards
 - .2 12 required (or as required by Fire Department)
 - .3 Mounted on U-posts in asphalt and concrete sidewalk.

Part 3 Execution

3.1 INSTALLATION

- .1 Erect and secure signs plumb and level at elevations as indicated.
- .2 Comply with sign manufacturer's installation instructions and approved shop drawings.
- .3 Mechanical attachment:
 - .1 To concrete or solid masonry use lag screws and expansion bolts or screws and fibre plugs, as appropriate for stresses involved.
 - .2 To hollow masonry use toggle bolts or equivalent.
 - .3 To steel use bolts with nut and lock washers, self-tapping screws.
 - .1 Do welding to CSA W59.2. Finish exposed welds flush and smooth.
 - .4 To wood use screws.
 - .5 Secure into framing members behind stud walls or above ceilings.
 - .6 Mechanical fasteners on exterior to be non-staining, non-ferrous type.
 - .7 Fabricate special fasteners as required for installation conditions.
 - .8 Mechanical fasteners and methods of attachment subject to Engineer's approval. Obtain Engineer's approval before fixing to structural steel.
- .4 Adhesive attachment:
 - .1 Use self-stick adhesive foam tape to manufacturer's instructions to adequately fix sign and prevent "rocking". Keep tape maximum 1.6mm from edges.

3.2 CLEANING

- .1 Leave signs clean. Remove debris from interior of sign boxes.
- .2 Touch up any damaged finishes.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 05 50 00 - Metal Fabrications: Suspended channel support for ceiling hung partitions.
- .3 Section 10 28 10 - Toilet And Bath Accessories.
- .4 Section 03 41 00 – Plant- Precast Structural Concrete.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-71.20, Adhesive, Contact, Brushable.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-B651, Barrier-Free Design.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate fabrication details, plans, elevations, hardware, and installation details.

1.4 SAMPLES

- .1 Submit samples of finish hardware and phenolic plastic in selected colour and finish in accordance with Section 01 33 00 - Submittal Procedures, for approval of Consultant.

1.5 STORAGE AND PROTECTION

- .1 Protect finished laminated plastic surfaces during shipment and installation. Do not remove until immediately prior to final inspection.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal packaging material in appropriate on-site bins for recycling.
- .3 Place materials defined as hazardous or toxic in designated containers.

- .4 Divert unused metal materials from landfill to metal recycling facility as approved by Consultant.
- .5 Unused sealant and adhesive material must be disposed of at an official hazardous material collections site as approved by Consultant.
- .6 Fold up metal banding, flatten and place in designated area for recycling.
- .7 Do not dispose of unused sealant and adhesive material into sewer system, into streams, lakes, onto ground or in any other location where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

- .1 Laminated plastic toilet partitions.
- .2 Plastic Laminate Faced Partitions: high pressure laminate matte finish surface on high density particle board, floor anchored and head braced. Two (2) colours will be chosen by the Consultant from laminate manufacturer's standard selection. Locations: Washrooms; refer to drawings.
- .3 Laminated plastic adhesive: to CAN/CGSB-71.20.
- .4 Sealer: water resistant sealer or glue as recommended by laminate manufacturer.

2.2 COMPONENTS

- .1 Safety Release Coat hook:
 - .1 High strength polycarbonate coat hook with safety release weight under downward pressure to not exceed 12 kg (26 lbs.)
 - .2 Supply all suitable mounting hardware for a vandal proof, secure installation using stainless steel sleeve bolts on partition doors or panels. Do not supply standard Robertson or Phillips head screws.
 - .3 Colours: 2 premium colours from manufacturer's complete range.
 - .4 Acceptable Materials: "HenkelHook" as manufactured/distributed by Henkel Diversified Inc, London ON.
 - .5 Alternate Acceptable product by "Frost" distributed by Architectural School Products.
 - .6 Locations: in all barrier free washroom locations as noted in article 2.4 below.
 - .7 Samples: submit test data and samples for review as specified in Section 013330 – Submittal Procedures.
- .2 Door pull: Barrier-free type suited for outswinging doors stainless steel.

2.3 MATERIAL DESCRIPTION

- .1 Laminate Faced Partitions: floor mounted and head rail braced. Fabricated with:

- .1 1.6 mm high pressure laminate facings and edging on 45 lb. density resin impregnated high density fibreboard, and complete with stainless steel hardware and fittings.
- .2 Doors, pilasters and partitions to be min, 25 mm thick.
- .3 headrails to be 24 x 41 anodized aluminum anti-grip type with sloped top configured and installed to prevent swinging or concealment of small items.
- .4 pilasters to have 3.2 mm core and integral leveling device concealed by 100 mm high stainless steel shoe.
- .5 Hinges: to be stainless steel, continuous hinges on all doors for entire length of door.
- .6 pulls on outside of handicapped doors
- .7 all doors to have rubber tipped bumper and slide bar latch, combination door stop and keeper, all attached with stainless steel sleeve bolts with theft proof heads.
- .8 no coat hooks to be provided.
- .9 provide stops on top and bottom of all doors
- .10 All partitions to be anchored to wall by means of stainless steel channel bracket for full height of partition.
- .11 Provide urinal screens/privacy screens between toilets in Pre-School & Toddler Washroom.
- .12 Acceptable Manufacturers: Model 1042 series by Bobrick Washroom Equipment of Canada Ltd.; Series 130GP by ASI Global Partitions; Series 3 style 2 by Twin-Cee, Metpar or products meeting these exact specifications by Ampco Products Ltd., Shanahan's Ltd., Bradley, General Partitions Manufacturing Corporation, Metpar, Hiny Hiders solid plastic by Scranton Products and others meeting or exceeding these exact specifications if reviewed and approved by the Consultant during the tender period.

2.4 FABRICATION

- .1 Fabricate pilasters and stiles minimum 25 mm thick, and panels and doors minimum 25 mm thick, of materials as specified.
- .2 Supply steel floor inserts and locations to Contractor for placing prior pouring of floor slab.
- .3 Provide pilasters with 2.9 mm, stainless steel leveling bar, rod and anchor concealed by one-piece 102 mm high stainless steel.
- .4 Include panel brackets, continuous hinges, door stops, latches, safety release coat hooks for metal partitions, fastening devices, bumpers, and pull on the outside of doors to handicapped accessible compartments.
- .5 Coat hooks to be mounted in ALL barrier free washrooms and shall be safety release style and mounted on the side wall.

Part 3 Execution

3.1 INSTALLATION

- .1 Install compartments in accordance with reviewed shop drawings and in a neat, rigid manner free of defects.
- .2 Provide anchors, inserts and fixings necessary for attachment of supports. Supply steel floor inserts and locations to Contractor for placing prior pouring of floor slab. Elsewhere, drill supports as required to receive attachment of compartments.
- .3 Install units secure, accurately positioned, plumb, level, square and free from sag and distortion. Provide 3 brackets per partition.
- .4 Perform drilling of steel, masonry and concrete necessary to install this work.
- .5 Ensure spaces between panels and pilasters, between panels and walls and between pilasters and walls are of uniform consistent width and sized to ensure it is not possible to see persons using the compartments.
- .6 Coordinate installation with the work of trades providing ceilings, wall and floor finishes, shower accessories and other adjacent components and construction.
- .7 Use stainless steel anchors and fasteners; ferrous metals are not acceptable.
- .8 Provide for adjustment of ceiling variations with screw jack through steel saddles made integral with pilaster. Conceal fixings with stainless steel shoes.
- .9 Do work in accordance with CAN/CSA-B651.

3.2 ADJUSTMENT

- .1 Upon completion of the work or when directed, remove all traces of protective coating or paper.
- .2 Clean exposed surfaces and fittings.
- .3 Test safety release Coat Hooks, continuous hinges, locks and latches and where necessary, adjust and lubricate. Set continuous hinges so that doors stand open maximum 30 degrees when compartment is not in use. Ensure that partitions are in working order.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 10 21 14 – Metal Toilet Compartments.
- .3 Section 102810 – Plastic Toilet Compartments.
- .4 Section 08 80 50 - Glazing: Mirrors.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM B456, Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - .3 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM A924/A924M, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.81, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
 - .2 CAN/CGSB-1.88, Gloss Alkyd Enamel, Air Drying and Baking.
 - .3 CAN/CGSB-12.5, Mirrors, Silvered.
 - .4 CGSB 31-GP-107Ma, Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-B651, Barrier-Free Design.
 - .2 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures
- .2 Shop drawings of units for use by the handicapped shall be distinctly marked and cross-referenced to the corresponding article in the specifications.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

Part 2 Products

2.1 MATERIALS

- .1 Ferrous Steel: Sheet, cold-rolled furniture steel, double annealed, mill stretched and leveled, and fully pickled. Otherwise, steel shall be hot-rolled or cold-rolled of alloy to suit needs of fabrication, use, and appearance.
- .2 Galvanized Steel: For sheet, Z275 zinc coating designation in accordance with ASTM Specification A525. For irregular sections, hot dip galvanized to comply with CSA G164.
- .3 Stainless steel sheet metal: to ASTM A167, Type 304, with No. 4 finish.
- .4 Anchors and Fastenings: Where exposed, use stainless steel and otherwise to match metal anchored. Where non-exposed, use the same as that specified for exposed, or use galvanized steel. Anchors and fastenings shall be of the type appropriate for the substrate to which accessory unit is secured.

2.2 COMPONENTS

- .1 Handicapped Grab Bars (GB & GBL): Model 1001-24", 1001-36" and 1003-30"x30" by Frost or ASI 3801-24P, ASI 3801-36P, and ASI 3807-4P by ASI Group Canada or alternates by Bobrick:
 - .1 Two (2) bars per water closet stall: one 600 mm long bar behind water closet and one 750 mm x 750 mm L shaped grab bar beside water closet mounted as per O.B.C. requirements.
 - .2 One in each shower stall: model FP (peened finish) 900 mm long L shaped grab bar, mounted as per O.B.C. requirements. Refer to interior elevation drawings.
 - .3 all bars to have concealed mounting hardware
 - .4 Quantity: refer to drawings.
 - .5 all bars to withstand horizontal and vertical pull of 2.2 kN
- .2 Handicapped Grab Bars - Flip-Up (GBF):
 - .1 18 gauge stainless steel, 38 mm diameter, 800 mm long flip-up grab bar with white wall mounting bracket, automatic locking system.
 - .2 Model: Flip-up by Dunleavy Cordun Associates (Tel: 905-470-6685)
 - .3 If locking grab bar not required, provide ASI 3513P & ASI 3513-25P, by ASI Group Canada (with toilet paper holder) or Frost F-1055-FTS (with toilet paper holder).
 - .4 Quantity: 1 - one with toilet paper holder.
 - .5 Location: Washroom 105.
- .3 Purse/Convenience Shelves (CS): Model B298x18 by Bobrick or Frost F-950-18 or ASI 0692-818 by ASI Group Canada:
 - .1 Quantity: 3
 - .2 Location: Washrooms: Health 106, Orthopedic 123, Barrier-Free 219.
- .4 Sanitary Napkin Disposal (SN): Model 620, by Frost

- .1 Quantity: refer to drawings
- .2 Location: Washrooms, refer to drawings
- .5 Safety Release Coat Hook (SCH):
 - .1 High strength polycarbonate coat hook with safety release weight under downward pressure to not exceed 12 kg (26 lbs.)
 - .2 Supply all suitable mounting hardware for a vandal proof, secure installation using stainless steel sleeve bolts on partition doors or panels. Do not supply standard Robertson or Phillips head screws.
 - .3 Colours: Allow for three (3) colours from Manufacturers standard line
 - .4 Acceptable Materials: “HenkelHook” as manufactured/distributed by Henkel Diversified Inc, London ON, tel (519) 641-5872 or by model 1150-CLRS by “Frost” distributed by Architectural School Products.
 - .6 Locations: Single Washrooms and Barrier-Free washrooms and stalls.
 - .7 Samples: submit test data and samples for review as specified in Section 013330 – Submittal Procedures.
- .6 Mirrors
 - .1 Fixed Mirrors (designation Type M):
 - .1 Best quality, 6 mm thick float glass, with concealed tamperproof clip fasteners.
 - .2 24 ga., Type 302 or 304 No 4 finish stainless steel frames on all edges and galvanized iron backing with concealed mounts.
 - .3 Sizes: each unit 457 mm x 610 mm.
 - .4 Locations: as shown on Drawings.
 - .5 Acceptable Materials: Frost ‘Stock series’ model 941TG Tempered Glass; 18” x 24” each.
 - .6 Acceptable alternate: Model 5440 by Twin Cee; or "Tamperproof" model by Pilkington Ford
 - .2 Fixed Mirrors (designation Type ML):
 - .1 Best quality, 6 mm thick float glass complete with concealed, tamperproof clip fasteners
 - .2 24 ga., Type 302 or 304 No 4 finish stainless steel frames on all edges and galvanized iron backing with concealed mounts.
 - .3 Sizes: each unit 610 mm x 1520 mm.
 - .4 Locations: as shown on Drawings.
 - .5 Acceptable Materials: Bobrick Model B-290 2460; 24” x 60” each.
 - .6 Acceptable alternate: equivalent size and details by Bobrick or Twin Cee
 - .3 Barrier-Free/Tilt Mirrors (designation Type TM):
 - .1 Acceptable Materials: Frost ‘Stock series’ model 941FG Tempered Glass; Bobrick 290 series or Frost F974FT series
 - .2 18” x 24” each..
 - .3 Locations: as shown on drawings.
 - .4 Frames: Type 302 or 304 No. 4 finish stainless steel.
 - .5 Mirror Cushioning: PVC pressure-sensitive foamed tape, 6 mm thick with adhesive on one side.
- .7 Waste Receptacle (SMWR):

- .1 387 x 210 x 648 mm size; 22 ga. stainless steel Frost type 326 No.4 brushed finish; 50 litre capacity removable waste bin. Surface mounted.
- .2 Model 326, by Frost
- .3 Quantity: refer to drawings
- .4 Location: Washrooms, refer to drawings.

- .8 Janitorial Shelf (JS):
 - .1 0.9 mm thick stainless steel, 914 x 203 mm size, surface mounted; complete with 3 mop/broom holders, 2 pail hooks and an 8 mm OD chrome plated drying rod
 - .2 Model 1115, by Frost
 - .3 Quantity: 2
 - .4 Location: Custodian Storage rooms 158 & 224 (1 in each)

- .9 Acceptable Alternates to those items listed above as manufactured by Bradley Corp. & Supplied by Wentworth Assoc. Ltd., Frost Products Ltd., Watrous (ASI) or Bobrick Washroom Equipment Co. and Saferail meeting or exceeding these specifications.

- .10 Hand Dryers (HD): refer to Electrical specifications.

- .11 Towel Bars (TWB): Model B530 (peened finish) by Bobrick or ASI 3800-Series by ASI Group Canada:
 - .1 16 ga., 32 mm O.D. by 750 mm long with concealed mounting hardware.
 - .2 Install at 1000 mm above finish floor level.
 - .3 Quantity: 1
 - .4 Location: in 124 Orthopedic Washroom adjacent shower stall.
 - .5 Acceptable Alternatives: Watrous

- .12 Folding Shower Seats (FSS): Model B5181 by Bobrick or F974-P by Frost or ASI 8206 by ASI Group Canada:
 - .1 One in the handicapped shower stall, with s.s. retaining clips.
 - .2 Quantity: 1
 - .3 Location: in UTR Washroom shower stall.

- .13 Shower Rod and Curtain (SR+C):
 - .1 Rod: No. B6047 extra heavy duty, by Bobrick or Frost F-1145-S or ASI 1204 by ASI Group Canada, 18 gauge stainless steel
 - .2 Curtain: 8 gauge vinyl fabric No. B204-3 (1780mm width) B204-1 shower curtain hook by Bobrick or ASI 1200-V and 1200-SHU by ASI Group Canada; 1830 mm high, 300 mm wider than opening.
 - .3 Location: UTR Washroom 105.

- .14 Soap Dispensers (Recessed): Model B-4063 by Bobrick or ASI 9326 by ASI Group Canada.
 - .1 Quantity & Location: 1 located in UTR 105 shower stall.

- .15 Toilet Tissue Dispenser (TD): supplied by School Board. Installed by Contractor.

- .16 Paper Towel Dispenser (PTD): supplied by School Board. Installed by Contractor.

- .17 Soap Dispensers (SD): supplied by School Board. Installed by Contractor.
- .18 Adult Change Table
 - .1 Adjustable powered wall mount adult sized Change Table
 - .2 Model: WM-1002
 - .3 Acceptable manufacturer: Can-Dan Rehatec Ltd.
 - .4 Two adjustable belts and 50mm thick removable mattress.
 - .5 To be mounted to reinforced concrete block walls.
 - .6 Coordinate with electrical for receptacle location.
- .19 Acceptable Alternates to those items listed above as manufactured by Bradley Corp. & Supplied by Wentworth Assoc. Ltd 905 627-7070 or Frost Products Ltd. meeting or exceeding these specifications.

2.3 FABRICATION

- .1 Construction: Fabricate with materials, component sizes, metal gauges, reinforcing, anchors and fasteners of adequate strength to withstand intended use.
- .2 Where specified as frameless, provide stainless steel accessories with one-piece fronts having 90 degree formed returns at their edges and openings.
- .3 Where accessory fronts are framed, frame edges, both inside and outside, with 90 degree formed returns continuously welded and ground smooth at the corners. Doors shall also have 90 degree formed returns as specified.
- .4 Unless otherwise specified, hinges shall be semi-concealed stainless steel piano hinges extending full-length of hinged element. Provide hinged elements with concealed, mechanically-retained rubber bumpers for silent closing, and shall close flush with faces of fronts or frames.
- .5 Ensure that work will remain free of warping, buckling, opening of joints and seams, distortion and permanent deformation.
- .6 No exposed fixings permitted. Cut edges and openings square and smooth. Chamfer corners of edges and cut-outs 1.6 mm.
- .7 Assembly: Accurately cut, machine and fit joints, corners, copes and mitres so that junctions between components fit together tightly and in true planes.
- .8 Fasten work with concealed methods, unless otherwise indicated on Drawings.
- .9 Weld all connections where possible, bolt where not possible and cut off bolts flush with nuts. Countersunk bolt heads, and provide method to prevent loosening of nuts. Ream holes drilled for fastening.
- .10 Welded joints shall be tight, flush, and in true planes with base metals. Make welds continuous at joints where entry of water into voids of members or assemblies is possible.

- .11 Provide for differential movements within assemblies and at junctions of assemblies with surrounding work.
- .12 Welds in exposed locations shall be ground and polished smooth.
- .13 Finish Work: Provide holes and connections for related work installed under other Sections of this specification, if applicable.
- .14 Cleanly and smoothly finish exposed edges of materials, including holes.

Part 3 Execution

3.1 INSPECTION OF SECTION

- .1 Take site measurements to ensure that work is fabricated to fit surrounding construction around obstructions and projects in place, or as shown on drawings, and to suit service locations.

3.2 INSTALLATION

- .1 Install all accessories in accordance with manufacturers' instructions at their recommended mounting heights unless noted otherwise on drawings.
- .2 Securely fasten accessories plumb, true, square, straight, level, and accurately and tightly fitted together and to surrounding work. Install in locations shown and specified herein. Mounting heights as shown or in accordance with the OBC in the case of barrier-free accessories.
- .3 Work shall include anchor bolts, bolts, washers and nuts, lag screws, expansion shields, toggles, straps, sleeve brackets, clips, and other items necessary for secure installation, as required by loading and by Jurisdictional Authorities.
- .4 Attach work at wood by screws through countersunk holes in metal.
- .5 Attach work to masonry with lead plugs and non-corrosive fastenings, to support load with a safety factor of 3. Perform all drilling necessary to install the work.
- .6 Insulate between dissimilar metals or between metals and masonry or concrete with bituminous paint, to prevent electrolysis.
- .7 Coordinate installation with the work of other trades adjacent to accessories to achieve the reveals or other edge conditions shown, where their front faces are flush with the finished wall surfaces.
- .8 School Board to supply and install remainder of washroom accessories not specified here (toilet paper dispensers, etc.). Cooperate with Board as required.

3.3 CLEANING UP AND ADJUSTMENT

- .1 Upon completion of work, or when directed, remove all traces of protective coatings or paper.
- .2 Test mechanisms, hinges, locks and latches, and where necessary, adjust and lubricate and ensure that accessories are in perfect working order.

END OF SECTION

Part 1 General

1.1 RELATED WORK

- .1 Section 01 33 00 - Submittal Procedures.

1.2 WORK INCLUDED

- .1 Supply and install prefabricated unit as specified in location shown on drawings.
- .2 Supervision, inspection and checking of unit as installed on site.

1.3 REFERENCES

- .1 Drawing designation: “Precast Concrete Storage Shed”. Refer to Site Plan drawing.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

1.5 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

1.6 GUARANTEE

- .1 Submit a written Guarantee to the Board, that all work of this Tender shall be free from defects in workmanship and materials for a minimum period of one (1) year from date of approved completion.
- .2 All defects (excluding vandalism) in materials and workmanship that become apparent during the Guarantee period shall be made good or material replaced at no cost to the Board.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling.
- .3 Place materials defined as hazardous or toxic in designated containers.
- .4 Divert unused metal materials from landfill to metal recycling facility as approved by Consultant.
- .5 Unused paint or coating material must be disposed of at an official hazardous material collections site as approved by Consultant.
- .6 Fold up metal banding, flatten and place in designated area for recycling.

- .7 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in any other location where it will pose health or environmental hazard.

1.8 LOCATION

- .1 Locations shown on Site Plan drawing. Final location to be coordinated with Architect and Owner.

Part 2 Products

2.1 MATERIALS

- .1 Pre-cast concrete building/storage unit, Pre-cast concrete building/storage unit.
- .2 **Model-40**, as manufactured by Brooklin Concrete Products, 1-800-655-3430 or approved alternate. Size: 8'-4" x 5'-6" x 6'-7" high. Weight: 9,000 lbs. Qty: **five (5) units** located in childcare and kindergarten play areas.
- .4 Construction:
 - .1 steel reinforced walls, roof & base.
 - .2 16 ga. painted steel doorframe cast into wall for security.
 - .3 live roof load 40 p.s.f.
 - .4 max.wind load 31 p.s.f. (equivalent hourly wind pressure 14.4 p.s.f.)
 - .5 concrete 4000 p.s.i. minimum.
 - .6 exposed aggregate walls (natural stone finish)
 - .7 base, clean smooth (white) concrete.
 - .8 graffiti resistant exterior coating.
 - .9 no joints between walls or between walls & roof for superior weather protection and to eliminate maintenance.
 - .10 delivered and place as (1) piece (no on-site assembly)
 - .11 seal between walls & base is maintenance free mastic.
 - .12 (2) heavy duty aluminum vents with birdscreen to provide free area of 120 square inches.
- .5 Door & hardware:
 - 1 Two - 31-1/2" x 70" x 1-3/4" thick hollow metal doors for Model 70.
One - 34-7/8" x 67-3/4" x 1-3/4" thick hollow metal doors for Model 40.
 - .2 16 ga. steel, wipe coated zinc base coat, with one coat galvaprime and two coats gloss exterior alkyd paint.
 - .3 spot welded edges.
 - .4 (3) vandal resistant hinges/door (Hagar BB2222x4, 5x4x619xNRP)
 - .5 steel top cap each door.
 - .6 aluminum & fibre door sweep bottom
 - .7 Schlage B160N deadbolt lock, standard (can be fitted with spec lock to match existing sets)
 - .8 Keying to be confirmed with Consultant.
 - .9 Both doors w/ spring softened chain checks (Mallory 1225).
 - .10 fixed doors w/top & bottom surface bolts (onward564)

Part 3 Execution

3.1 INSTALLATION

- .1 For concrete or asphalt surface: Bearing pads to be provided if levelling is required

- .2 For grass site: 11'0" x 11'0" x 6" thick compacted stone chip base with 2" loose stone chips on top.
- .3 Comply manufacturer's installation instructions and approved shop drawings.

END OF SECTION

Part 1 General

1.2 RELATED WORK

- .1 Section 08 44 13 – Glazed Aluminum Curtain Walls
- .2 Section 08 50 00 – Aluminum Windows

1.3 SUBMITTALS

- .1 Product data:
 - .1 Submit duplicate copies of manufacturer's Product data in accordance with Section 01 33 00 indicating:
 - .1 Performance criteria, compliance with appropriate reference standard(s), characteristics, limitations, and finishes.
 - .2 Product transportation, storage, handling and installation requirements.
- .2 Shop drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00.
 - .2 Provide layout, details of track and operating hardware, installation details.
- .3 Samples: Submit 600 mm x 600 mm duplicate samples of Dual Sun Shade material and colour.
- .4 Closeout submittals:
 - .1 Submit following for each Product for incorporation into Operations and Maintenance Manuals in accordance with Section 01 78 00:
 - .1 Functional description detailing operation and control of components.
 - .2 Performance criteria and maintenance data.
 - .3 Operating instructions and precautions.
 - .4 Safety precautions.
 - .2 Submit maintenance data, wrenches or specialty tools, cleaning and maintenance instructions

1.5 QUALITY ASSURANCE

- .1 Shades and track shall be installed by a qualified specialist with 5 years proven experience in this type of work.

Part 2 Products

2.1 Motorized Roller Shading System (MRS):

- .1 Extruded aluminum hanger and closure using a linear motor, fabloc tube and necessary electrical accessories for a single switch or Motor group control operated as indicated on the Shading Schedule. Internal limit switches are adjusted by two hex keys to allow for exact stop positions. Solenoid activated disc brake stops and holds in any position. Asynchronous motor with built in reversible capacitor start and run, 95-125V-AC at 60Hz CSA and UL approved.

- .2 Specifications are based on 300 Series Solarblock 3%, colour to be selected later by Consultant.
- .3 MRS (Motorized Roller Shades)
Locations: all windows and curtain wall locations noted with “MRS” on floor plans.
Blinds to span between curtain wall mullions, using maximum fabric widths available.
Shades to be provided in Learning Commons.
- .4 ‘Motorized Shade with wall mount fascia’ by Solarfective or approved alternative.
- .5 Manufactured by Solarfective Products Ltd., Rep: Patri Products, Kevin Booth (416)421-3800 Fax: (416)421-8424, or Silent Gliss Model 4110 by Architectural Products, Rep. Tim MacCallum Tel: (905)507-1275 Fax: (905)507-1282 or Mecho/5 Model by CartsPlus Healthcare Products Ltd., Rep. Eva Speziale Tel: (905) 602-6794 or Sun Glow Window Covering Products of Canada Ltd.
- .2 All shades systems specified in this section shall be provided by one manufacturer who shall take full responsibility for the total individual school project.

2.2 Manual Roller Shades (RS):

- .1 Manually controlled, extruded aluminum hanger and closure.
- .2 Specifications are based on 300 Series Solarblock 3% open, advanced polyester sun control fabric. Colour to be selected later by Consultant.
- .3 Locations: noted on drawings with ‘RS’.
- .4 Recess into windows and curtainwall where possible.
- .5 Manufactured by Solarfective Products Ltd., Rep: Patri Products, Kevin Booth (416) 421-3800, Mechoshade Systems Inc., as distributed by CartsPlus Healthcare Systems Ltd., 905-602-6794, or Silent Gliss Model 4110 by Architectural Products, Rep. Tim MacCallum Tel: (905)507-1275 Fax: (905)507-1282 or Mecho/5 Model by CartsPlus Healthcare Products Ltd., Rep. Eva Speziale Tel: (905) 602-6794 Faradays Window Fashions Inc., Moduline Lite-lift by ALTEX/SunProject, as distributed by Star Canada Shades tel: 647-982-2020 or Sun Glow Window Covering Products of Canada Ltd.
- .6 All shades systems specified in this section shall be provided by one manufacturer who shall take full responsibility for the total project.

2.3 Solarfective Shading blackout fabric:

- .1 Shade cloths shall be woven of .018 opaque, vinyl coated polyester yarn consisting of approx. 79% vinyl and 21% 500 denier polyester core yarn. The fabric shall be tensioned in the finishing range prior to heat setting to keep the warp ends straight and minimize or eliminate weave distortion to keep the fabric flat. The fabric shall be dimensional stable. Colour will be selected from standard range. It shall be tear resistant meeting NFPA 701.
- .2 Meet or exceed the following statistics:

Openness Factor	3%+0.0%-0.5%
-----------------	--------------

Weight per sq.yd.		21 oz.
Warp ends per inch		42
Fill ends per inch		31
Stretch % (271lb.wt.):	warp	2%
	fill	3%
Set %	warp	1.5%
	fill	1.5%
Abrasion Resistance	YARN	none
(500 Tarber Cycles)	RAPTURE	none
	WEAR	TRACE
U.V. Deterioration	Fade	none
(200 Sun Fade Hours)		
Tensile Retention		96%

Part 3 Execution

3.1 INSTALLATION

- .1 Securely install shades and track adding brackets as required but in no case less than four brackets.
- .2 After installation fabric shall hang flat, without buckling or distortion. The edge when trimmed, shall hang straight without ravelling. An unguided roller shade cloth shall roll true and straight, without shifting sideways more than 3mm in either direction due to warp distortion, or weave design.

3.3 ASSEMBLY – MOTORIZED SHADE

- .1 Extruded Aluminum Shade Tube: 1.52 mm thick, 75 mm diameter with three internal, continuous fins 4.82 mm high for strength and drive capabilities when attached to the nylon sprocket. The fins shall be spaced 120 degrees apart.
- .2 Fascia: 1.7 mm thick, extruded aluminum cover, clear anodized finish. To cover front of shade and return at underside to conceal roller and hardware.
- .3 Internal Limit switches: adjustable with two hex keys to allow exact setting of stop position. Micro switches to provide circuit breaking at end of run. Switch setting not to be disturbed by roller tube action.
- .4 Brake: solenoid activated disc brake mechanism stops and holds any position, brake to disengage when motor is running.
- .5 Motor: Built-in reversible capacitor start and run. Single phase 95-125V-AC, 60 Hz motor with thermally protected class A temperature rating.
- .6 Gear box: Satellite gears with 3 levels for load distribution with planetary type gears machined to close tolerance of tempered steel.

- .7 Controls: Motors will be operated by white three position rocker switch, located remotely.
- .8 Exterior Hembar: Extruded aluminum in clear anodized finish with plastic end finials.
- .9 Dynamic Hembar: At sill locations, in lieu of bottom channel, provide aluminum Dynamic Hembar with same finish as side channels. Upon contact with sill, it shall provide a light seal even if the sill is slightly out of level.
- .10 Colour: Exposed surfaces (excluding fabric) shall be colour selected by Consultant, and not necessarily from manufacturer's full colour range. Metal components shall be pretreated and finished with an acceptable baked enamel finish.
- .11 Fasteners: Non-corrosive metal screws for attachment to windows or curtain wall framing, concealed in completed installation.
- .12 Shade and mounting system to be designed to allow air between shade and glass.
- .13 Fabric shall hang flat, without buckling or distortion. Trimmed edges shall hang straight without curling or raveling.
- .14 Unguided vertical shades shall not drift sideways more than 3 mm in total run.
- .15 Provide stops at highest and lowest shade positions to prevent over winding and unrolling.
- .26 Design and fabricate shades so that there is a maximum 12 mm gap both sides of fabric.

3.4 CLEAN UP

- .1 At conclusion of work remove all debris, dirt; clean surfaces like glass, floor, stools, heating units if soiled. Test each re-installed drape, each sunshade numerous times and make adjustments to assure trouble-free installation and operation.
- .2 Brief maintenance staff regarding proper care, cleaning, lubricating, adjusting, etc.

END OF SECTION

Part 1 General

1.1 GEOTECHNICAL INVESTIGATION

- .1 A copy of the Geotechnical Report and Borehole Logs is enclosed in Binder C
“Architectural Details & Geotechnical Report”.

PROJECT NAME: **Geotechnical Investigation**
 Proposed Elementary Addition
 9149 Airport Road, Mount Hope ON
Prepared by: **Soil-Mat Engineers & Consultants Ltd.**
Date: September 25, 2024
Proj. Ref. SM 240669-G

Soil Characterization Report
Date: October 23, 2024
Proj. Ref. SM 240669-G

1.2 DISCLAIMER

- .1 The Geotechnical Report is not part of the Contract Documents prepared by the Architect or his sub consultants. It is bound into the Specifications set for convenient reference only. The Geotechnical report was not prepared by or under the supervision of the Architect. While every effort has been made to attempt to provide comprehensive geotechnical information for the purposes of design and tendering, the Architect claims no responsibility for the accuracy of the information contained in the report.
- .2 Refer to Section 00 21 13 – ‘Instruction to Bidders’, Examination of the Site.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED WORK

- | | | |
|----|--|------------------|
| .1 | Summary of Work – Phasing and Sequencing | Section 00 22 00 |
| .2 | Site Grading | Section 31 23 13 |
| .3 | Excavating, Trenching and Backfilling | Section 31 23 10 |

1.2 SCOPE

- .1 Refer to survey, site layout, site servicing, landscape and grading drawings and Geotechnical Report.
- .2 Work to this section is anticipated to be carried out under a Site Alteration Permit (Fill Permit).

1.3 EXAMINATION

- .1 Examine the Drawings, Specifications, and Geotechnical Report which summarize site soil conditions. It is the contractor's responsibility to understand the site and determine the work extent and nature of the existing conditions. In no circumstances will any claims against the Owner be allowed resulting from failure to ascertain the work herein described or implied.
- .2 Report to the Consultant in writing any conditions which will prejudice the proper completion of the work of this Section. Commencement of work constitutes acceptance of existing conditions.

1.4 BURIED SERVICES

- .1 Before commencing work confirm no buried services remain on the site and locate all services adjacent to the site. Engage private locate firm for underground scan for all areas of work outside the property lines.
- .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work. Pay costs of relocating services.

1.5 PROTECTION

- .1 Establish locations of all electrical, telephone, or other service installations existing in the areas of site preparation by contacting the service owners and obtaining their approval to work in such areas. Contact the Municipality, the Region and local utilities to review proposed scheduling, work activities and regulations pertaining to all work beyond the limits of the property including but not limited to parking areas, storm water outlet and headwall and asphalt driveway entrances. Provide adequate markers or take protective measures to ensure that no damage will be caused under this Section. Repair or replace damaged work as required without cost to the Owner.

- .2 Electronically locate, map and record location of services prior to doing any excavation.

1.6 DUST CONTROL

- .1 Provide and maintain to the Consultant's satisfaction, adequate system to avoid any nuisance caused by dust and dirt rising throughout the area of operations.

1.7 SILT CONTROL

- .1 Refer to site plans and any approved drawing issued with the building permit.
- .2 Provide and maintain to the Consultant's and to the Authorities' satisfaction, control systems to prevent silt from entering any storm drainage system.

Part 2 Products

2.1 NOT APPLICABLE

Part 3 Execution

3.1 DISPOSAL OF WASTE AND SURPLUS MATERIALS

- .1 Except where specified or indicated on Drawings to be retained on site, or to be reused, remove from the site, all waste and surplus materials resulting from site preparation work on a daily basis. Dispose of as required in accordance with local or provincial regulations. Under no circumstances shall the burning of rubbish be permitted on the site. Where items are to be reused, store on site where designated and provide temporary protection to same to prevent damage by construction operations.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 Read and be governed by conditions of the Contract and sections of Division 1.

1.2 SITE CONDITIONS

- .1 Known underground and surface utility lines and buried objects are indicated on site plan. Underground utility lines or other buried objects not shown on site plan are the responsibility of the Contractor and must be established in location and depth before commencing work.

1.3 PROTECTION

- .1 Prevent damage to trees, landscaping, natural features, benchmarks, surface or underground utility lines, which are to remain. Make good any damage.

Part 2 Products

2.1 MATERIALS

- .1 Obtain approval of excavated or graded material used in fill for grading work. Protect approved material from contamination.

Part 3 Execution

3.1 GRADING

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated or specified in other sections.
- .2 Rough grade to depths below finish grades as required to install pavements and landscape treatments. Refer to details for required depths.
- .3 Slope rough grade away from building 1:50 minimum.
- .4 Prior to placing fill over existing ground, scarify surface to depth of 150mm. Fill all depressions, etc., with approved fill. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .5 Compact filled and disturbed areas to corrected minimum dry density/maximum dry density to ASTM D698-00, Standard Proctor, method C/D, as follows:
 - .1 90% under soft landscaped areas

- .2 98% under paved and walkway areas
- .6 Do not disturb soil within branch spread of trees or shrubs to remain.

3.2 TESTING

- .1 Inspection and testing of soil compaction will be carried out by designated testing laboratory.

3.3 SURPLUS MATERIAL

- .1 Remove surplus material from site as directed by Consultant and in accordance with all municipal with provincial regulations.
- .2 Remove material unsuitable for fill, grading or landscaping from site.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 00 22 00 – Summary of Work – Phasing and Sequencing
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 56 00 - Temporary Barriers and Enclosures.
- .4 Section 01 35 43 - Environmental Procedures.
- .5 Section 31 23 13 - Rough Grading.
- .6 Section 32 91 21 – Top soil and Finish Grading.
- .7 Section 31 05 17 - Aggregate Materials.
- .8 Section 32 93 10 - Landscaping and Plant Maintenance.
- .9 Section 33 46 20 – Foundation and Underslab Drainage.
- .10 Section 32 12 17 – Asphalt Paving.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

- .1 Work of this Section shall include protection measures, consisting of materials, constructions, and methods required by the Occupational Health and Safety Act, of the Province of Ontario, and as otherwise imposed by Jurisdictional Authorities to save persons and property from harm.
- .2 Submit shop drawings required by authorities.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C117-95, Standard Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422-98, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .5 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .6 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A3000-98-A5-98, Portland Cement.
 - .2 CAN/CSA-A23.1-00, Concrete Materials and Methods of Concrete Construction.

1.4 DEFINITIONS

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock : any solid material in excess of 0.25 m³ and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m³ bucket. Frozen material not classified as rock.
 - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.
- .3 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .6 Unsuitable materials:
 - .1 Weak and compressible materials under excavated areas.
 - .2 Frost susceptible materials under excavated areas.
 - .3 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136 : Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
 - .2 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.
- .7 Unshrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.5 SUBMITTALS

- .1 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Inform Consultant at least 2 weeks prior to commencing Work, of proposed source of fill materials and provide access for sampling.
- .3 Submit 25 kg samples of type of fill specified including representative samples of excavated material.
- .4 Ship samples prepaid to Inspection firm, in tightly closed containers to prevent contamination.

1.6 QUALITY ASSURANCE

- .1 Submit design and supporting data at least 2 weeks prior to commencing Work.
- .2 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of Ontario, Canada.
- .3 Keep design and supporting data on site.
- .4 Engage services of qualified professional Engineer who is registered or licensed in Province of Ontario, Canada in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate plastic, paper packaging and corrugated cardboard and place in designated containers.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Ensure emptied containers are sealed and stored safely.
- .4 Based on the analytical soil data provided in Binder C, there is an area of tested material at BH6 SS2 that has been shown to exceed the Table 2.1 and 3.1 ICC Standards for Zinc. Refer to the geotechnical report for preliminary disposal option information and potential for reuse of material on site. The cost of any required disposal are the Contractor's responsibility.

1.8 PROTECTION OF EXISTING FEATURES

- .1 Refer to *Section 01 11 00 – 'Summary of Work – article 1.5 Existing Conditions'* and *Section 31 23 13 – 'Rough Grading'* for requirements to provide underground scan in addition to service locates for all areas of work beyond the property lines.
- .2 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.
- .3 Existing buried utilities and structures:
 - .1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .2 Prior to commencing excavation Work, notify applicable School Board or authorities having jurisdiction, establish location and state of use of buried

- utilities and structures. School Boards or authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.
- .3 Confirm locations of buried utilities by careful test excavations.
 - .4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.
 - .5 Ensure that adjacent property is not damaged in any way by 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.
 - .6 Ensure that 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. Arrange or ensure that all damage which occurs is repaired completely and immediately.
 - .7 Protect newly-graded areas from the action of the elements. Repair settlement and washouts that occurs before acceptance of the work, and re-establish grades to the required elevations and slopes. Fill to required subgrade levels any area where settlement occurs.
 - .8 Bail or pump all water out of excavation, from whatever cause, as it accumulates. Take all necessary measures to prevent flow of water and earth fines into the excavation.
 - .9 Support existing buildings, walks, roads, and services, and prevent cave-ins of excavated banks. A Professional Engineer specializing in this work shall design all protection. Provide shop drawings for authorities as required.
 - .10 Temporarily cover all existing catchbasins and manholes to prevent entry of earth or debris.
 - .11 Electronically locate underground services such as electrical and telephone lines, gas and water and sewer lines. Mark line of services with yellow ribbons or stakes with tip fluorescent painted, and indicating both plan location and depth.
 - .12 Protect the bottom and sides of the excavated pits and trenches from exposure to sun and rain to prevent cave-ins and softening of the bed upon which concrete and drains rest.

1.9 DUST CONTROL

- .1 Provide and maintain adequate system to avoid any nuisance caused by dust and dirt rising throughout the area of operations. The use of calcium chloride is prohibited.

Part 2 Products

2.1 MATERIALS

- .1 NOTE: No recycled material is permitted.
- .2 Fill "A": Granular material meeting OPSS Material Specification for Aggregates, Form 1010, Granular "A". Minimum compaction density 98% Standard Proctor. For use primarily as bedding material.

- .3 Fill "B": Granular material meeting OPSS Material Specification for Aggregates, Form 1010, OPSS Granular "B"-Type 1 or 2 (crushed limestone bedrock). Minimum compaction density 98% Standard Proctor. For use primarily as fill under building slab on grade areas.
- .4 Fill "C": Site (native) material, containing no organic or foreign matter, and which the Contractor can demonstrate is compactable to a density of 98% to 100% Standard Proctor. Minimum compaction density: 95% Standard Proctor under landscaped areas, 100% under paved areas. For use primarily as fill under playfields areas and under paved areas up to underside of sub-base elevation.
- .5 Fill "D": Refer to Section 32 12 17 –‘Asphalt Paving’ for 50 mm Crushed limestone sub-base and 19 mm crushed limestone base course used under paved areas.
- .6 “Fill E”: Imported fill for general site areas. Imported fill shall be clean, free of organic material and rocks, shale and cobbles, and Contractor to supply environmental documents, including results of sufficient number of chemical tests, to ensure that the fill meets Reg 153/04 (2011)-Table 1 Residential/Industrial. Approval to proceed with importing the fill to the Site will only be issued following review and acceptance by our Consultant.
- .7 Crushed Stone Fill Under Slabs on Grade: Clean, Graded 20mm angular, natural clear crushed stone from approved source, free from shale, clay and friable materials and organic matter and containing no more than 10% passing the No.4 sieve
- .8 Impervious Fill: Fine grain material such as clay, which is relatively impervious to the flow of water.
- .9 Granular Bedding: OPSS Granular "A", concrete sand (CAN/CSA A23.1-M90) or crusher-run limestone. Minimum compaction 100% Standard Proctor density.
- .10 Any imported fill must be chemically clean, meeting Reg 153/04 (2011) - Table 1 Residential/Industrial Criteria.

Part 3 Execution

3.1 SITE PREPARATION

- .1 The existing building and its foundations are to be removed in its entirety as part of this contract.
- .2 Prior to placing fill, all organics and existing unsuitable fill material is to be removed, and the subgrade thoroughly proof-rolled, inspected and approved by the geotechnical engineer, per the geotechnical investigation.
- .3 Based on the geotechnical information provided, it is understood that “the site was previously used for staging and stockpiling of soil and aggregate as part of construction of the surrounding developments. The topsoil had been previously been stripped from the surface of the site, leaving a generally thin veneer of residual organics and the underlying native soils.”

- .4 Based on the findings in the geotechnical report, the soil conditions encountered at the borehole locations are considered suitable to support the proposed buildings on conventional spread footings founded in the native silty clay/clayey silt or limestone bedrock, below any fill or otherwise unsuitable materials. Refer to the geotechnical investigation report located in Binder C for information and instruction.

3.2 EXAMINATION

- .1 Ensure in examination of the site that all possible factors concerning earthwork are investigated, and that the following are known in particular:
 - .1 Methods and means available for material handling, disposal, storage, and transportation.
 - .2 Physical conditions of site, including ground water table and drainage courses.
 - .3 Conformation and condition of ground surfaces.
 - .4 Character, quality, and quantity of surface and subsurface materials.

3.3 SOIL INVESTIGATION

- .1 Soil investigation of the site was carried out by other consultants engaged by the School Board for the purpose of guidance in design and construction. A report and bore hole log on this investigation were prepared and are provided for information purposes. No responsibility is assumed by the School Board or Architects for the scope, accuracy, or interpretation of the soil investigation report. Be responsible for adjusting estimates to incorporate conditions identified or reasonably inferred in the report, as documented in the Geotechnical Data.

3.4 STOCKPILING

- .1 Stockpile fill materials in areas designated by Engineer Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

3.5 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

- .1 Obtain permit from authority having jurisdiction for temporary diversion of water course.
- .2 Construct temporary Works to depths, heights and locations as directed by Engineer.
- .3 During backfill operation:
 - .1 Unless otherwise as indicated or as directed by Engineer, remove sheeting and shoring from excavations.
 - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
 - .3 Pull sheeting in increments that will ensure compacted backfill is maintained at an elevation at least 500 mm above toe of sheeting.
- .4 When sheeting is required to remain in place, cut off tops at elevations as indicated.

- .5 Upon completion of substructure construction:
 - .1 Remove cofferdams, shoring and bracing.
 - .2 Remove excess materials from site and restore water courses as indicated and as directed by Engineer.

3.6 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.
- .2 Dewater the site as necessary for the installation of the work, by providing a series of temporary trenches/pits and pumping as necessary. Backfill temporary trenches/pits and restore area when dewatering is no longer required.
- .3 At no additional cost to the School Board, dewater the site as necessary to maintain the schedule and protect the work. Ensure the water pumped from site does not contaminate sewers municipal or on site sewer system. If required, arrange and pay for the cost of flushing sewers used for dewatering drainage routes.
- .4 Submit for Engineer's approval details of proposed dewatering or heave prevention methods, such as dikes, well points, and sheet pile cut-offs.
- .5 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .6 Protect open excavations against flooding and damage due to surface run-off.
- .7 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures and in manner not detrimental to public and private property, or any portion of Work completed or under construction.
- .8 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, water courses or drainage areas.

3.7 EXCAVATION

- .1 Advise Engineer at least 7 days in advance of excavation operations for initial cross sections to be taken.
- .2 Perform bulk excavation and detailed excavation for construction of building (and for installation of mechanical and electrical services). Excavate beyond wall faces sufficiently to allow removal of forms, if applicable, but generally no more than 900 mm beyond centre of wall. Do not re-fill over excavated areas with materials removed, nor any other material without the approval of the Consultant. Excavation and disposal of boulders is part of this section.
- .3 The building area and all paved areas is to be stripped of topsoil, disturbed soils and any organic materials.

- .4 The exposed native subgrade should be proof-rolled. All soft and heaving areas should be sub-excavated and replaced with competent fill. The exposed native subgrade should be examined and approved by the geotechnical engineering prior to placement of fill.
- .5 Remove disturbed earth displaced by adjacent construction.
- .6 Notify the Consultant of completion of excavation work and before any concrete or fill is placed on the bearing strata, in order that he may inspect the exposed bearing surfaces.
- .7 If the Consultant requires additional excavation below the elevation indicated or specified, such additional excavation and disposal will be paid for on the basis of unit prices quoted in the Bid Form. Units of measurements will be those given for the unit prices, and shall be measured in their original position and computed by the method of average end areas.
- .8 Remove excess and unsuitable excavated materials from the site. Comply with the MOE regulations and those of other regulating bodies, regarding disposal of contaminated soil.
- .9 Blasting is prohibited, except upon written permission of Consultant. Rock removal, if required, shall be by means of Ram Splitting equipment only.
- .10 Keep all surfaces against which concrete, unit masonry or fill is to be placed free from frost. Thaw out frozen surfaces against which concrete or fill is to be placed to unfrozen depth.
- .11 Excavation must not interfere with bearing capacity of adjacent foundations.
- .12 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .13 Keep excavated and stockpiled materials a safe distance away from edge of trench as directed by Engineer.
- .14 Restrict vehicle operations directly adjacent to open trenches.
- .15 Do not obstruct flow of surface drainage or natural watercourses.
- .16 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .17 Notify Engineer when bottom of excavation is reached.
- .18 Obtain Engineer approval of completed excavation.
- .19 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of Engineer.
- .20 Surplus Excavated Material and Removals: The Contractor is to make his own arrangements for the disposal of all excavated materials, removals, grindings and all other

debris not suitable for re-use in the construction. If the Contractor enters into an agreement with an individual for the use of land for the disposal of excavated materials or for any other reason, a copy of the said Agreement clearly stating the obligation of all concerned and signed by all parties shall be submitted to the Consultant. The Contractor shall comply with the requirements of all Federal, Provincial and Municipal Laws, Acts, Ordinances, Regulations, Orders-in-Council and By-Laws, which could in any way pertain to the work outlined in the Contract. The items in the Form of Tender include all costs for disposal of unsuitable material off the site and the Contractor shall make the arrangements for the disposal of the materials removed in accordance with MOE Reg. 558.

- .21 Refer to the Geotechnical Report provided for results of the chemical analysis of soil and details regarding the allowance of surplus material to be used on site, or allowable disposal.

3.8 GEOTEXTILE

- .1 Provide geotextile in conjunction with the granular fill as outlined in the Geotechnical Report and Supplemental Comments.

3.9 STABILIZATION

- .1 As outlined in the Geotechnical Report and Supplemental Comments, contractor to provide stabilization measures during fill operation.

3.10 COMPACTION

- .1 Provide, operate and maintain compacting equipment necessary to achieve the compaction densities specified.
- .2 Compact fill until the required density is achieved. Do not compact material containing frost.
- .3 Fill hollows and depressions which develop under compaction with matching backfill material. If the base becomes rutted or displaced due to any cause, regrade the surface.
- .4 Compact backfill by means of vibratory type equipment capable of achieving the desired degree of compaction. Use manually operated vibratory tampers in the proximity of foundations and in areas not readily accessible to roller equipment. Make good damage to the structure due to compaction and settlement of fill. Report damage to foundations promptly to the Consultant. Obtain approval of remedial procedures.

3.11 BACKFILLING

- .1 Plug unused services such as drains, sewers, field tile, and service pipes uncovered by excavation.
- .2 Backfill at foundation walls only after they have been approved by Consultant.
- .3 Backfill with 200 mm deep layers of fill or as specified, each consolidated before the next is placed.

- .4 Backfill to mechanical and electrical service trenches as specified in the electrical and mechanical specifications.
- .5 When backfilling both sides of walls, place fill simultaneously on both inner and outer faces to balance pressure on wall.
- .6 Where walls are to be backfilled on one side only, commence backfilling only when the ground floor structural members are in place, if applicable, or adequate bracing is provided for top and bottom of foundation walls.
- .7 Compact fill to densities specified for material requirements.
- .8 Do not proceed with backfilling operations until Consultant has inspected and approved installations.
- .9 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .10 Do not use backfill material which is frozen or contains ice, snow or debris.
- .11 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .12 Backfilling around installations.
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
 - .3 Place layers simultaneously on both sides of installed Work to equalize loading.
 - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
 - .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Engineer.
 - .2 If approved by Engineer erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Engineer.
- .13 Install drainage system in backfill as directed by Consultant.

3.12 FILL UNDER FLOOR SLABS

- .1 All fill required to raise grades within the building footprint (for foundations and floor slab) to proposed finished floor elevation (FFE) is to be imported 'Fill B' (OPSS Granular "B", Type 1 or Type 2).
- .2 Prior to placing fill, all organics and existing unsuitable fill material is to be removed, and the subgrade is thoroughly proof-rolled, inspected and approved by the geotechnical engineer, per the geotechnical investigation. Any soft spots revealed during proof-rolling is to be sub-excavated and backfilled with Granular B, placed and compacted per the geotechnical report.

- .3 Prior to filling, proof-roll existing earth subgrade in order to identify inconsistencies or soft areas. Proceed with filling operations only after inconsistencies or soft areas have been reworked and compacted or excavated, backfilled and compacted as required to eliminate such conditions.
- .4 Avoid proof-rolling close to caissons, columns, walls and other structures within the confines of the proof rolling operations.
- .5 Prior to placing fill, ensure existing ground is compacted to 98% Standard Proctor density.
- .6 Place approved fill under floor slabs as soon as foundation walls are completed to floor level and mechanical and electrical services are installed in trenches.
- .7 Place fill in layers of 150mm maximum, and consolidate each before placing next layer.
- .8 Compact fill to density specified for material requirements with a heavy vibrating roller. Compact fill adjacent to walls, piers, or wherever else heavy roller equipment cannot approach, with mechanical tampers to equivalent density. Dig out soft spots and re-fill and compact to specified density.
- .9 Where undisturbed soil surface is low below areas of slab-on-grade, bring level up to within 200 mm of underside of slab fill with Fill "B". Do not use fill "C" within building area.
- .10 Backfill trenches to within 200 mm of underside of slab fill with Fill "B".
- .11 The final 200 mm layer under slabs shall be clear crushed stone, as specified. Place crushed stone in maximum 100 mm layers and compact to 100% Standard Proctor Density.

3.13 FILL UNDER PAVED AREAS

- .1 Prior to filling, proof-roll existing earth subgrade in order to identify inconsistencies or soft areas. Proceed with filling operations only after inconsistencies or soft areas have been reworked and compacted or excavated, backfilled and compacted as required to eliminate such conditions.
- .2 Avoid proof-rolling close to caissons, columns, walls and other structures within the confines of the proof rolling operations.
- .3 Prior to placing fill, ensure existing ground is compacted to 98% Standard Proctor density.
- .4 Place specified granular fill in layers of 150mm maximum, and consolidate each before placing next layer, up to underside of pavement sub-base elevation.
- .5 Compact fill to density specified for material requirements with a heavy vibrating roller. Compact fill adjacent to walls, piers, or wherever else heavy roller equipment cannot approach, with mechanical tampers to equivalent density. Dig out soft spots and re-fill and compact to specified density.

3.14 FILL UNDER PLAYFIELDS AND LANDSCAPED AREAS

- .1 Construction access, contractor parking areas and Portables Area are intended to be reinstated in time for sod to have a minimum of 6 weeks to “take” prior to Fit for Occupancy. Identify this target date on the project schedule. Conduct site work and schedule accordingly to complete work related to sodding these areas as early as possible prior to contract completion.
- .2 Use Fill “C” native site material for fill under the landscaped areas as indicated on drawings. Fill Type “E” may be considered for use, subject to all of the conditions being met as outlined above.
- .3 Prior to placing fill, ensure existing ground is compacted to 95% Standard Proctor Density.
- .4 Place fill in layers of 300 mm maximum and consolidate each before placing next layer.
- .5 Compact Fill “C” to minimum 95% Standard Proctor Density under playfields.

3.15 RESTORATION

- .1 Upon completion of Work, remove waste materials and, trim slopes, and correct defects as directed by Consultant.
- .2 Place topsoil as directed by Consultant.
- .3 Reinstall lawns to elevation which existed before excavation.
- .4 Reinstall pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .5 Clean and reinstall areas affected by Work as directed by Consultant.
- .6 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.
- .7 The School Board will engage the services of an Inspection and Testing Company to verify that work conforms to the requirements of the specifications.
- .8 The Contractor shall cooperate fully with the testing and inspection company.
- .9 The Contractor shall maintain its own quality control program to ensure that its work conforms to the drawings and specifications.
- .10 Submit 4 kg. samples of the fill materials to the inspection and testing company at least 10 days prior to commencement of backfill operations. Materials tested and approved shall constitute a standard for the acceptance of material delivered to the site.
- .11 The inspection and testing company shall be responsible for the following work:
- .12 Determine the depth of unsatisfactory material, if any, to be removed.
- .13 Inspect and approve the sub-grade prior to commencement of backfill operations.

- .14 Test and approve the proposed backfill materials.
- .15 Be present full time during operations in order to inspect and approve the methods of placing and compacting and to carry out the necessary tests to determine the Proctor Density of the backfill and the actual field densities being obtained. Take sufficient tests to ensure that adequate information is obtained to judge the uniformity of compaction. Inspect all piping and conduit in place in trenches prior to backfilling to ensure correct slope and placement as designed.
- .16 Check the quality of backfill being delivered to the site.
- .17 Check the depth of granular fill.
- .18 Confirm bearing elevations. Confirm and record spot elevations of all piping at critical locations to confirm design depths and slopes.
- .19 Check installation of weeping tile.
- .20 Issue reports to the Consultant tabulating test results and giving final approval and suggestions as to the backfilling and compaction operation.
- .21 The cost of such inspection and testing shall be paid for under the Fill and Compaction Testing Allowance specified in Section 01 11 00- Summary of Work. The cost of retesting unacceptable compaction shall be borne by this Section.

3.16 INSPECTION AND TESTING

- .1 Refer to Section 01 11 00- Summary of Work, Section 1.29.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 11 00 – Summary of Work
- .2 Section 013543 – Environmental Protection.
- .3 Section 329121 – Topsoil and Finish Grading.
- .4 Section 329310 – Planting of Trees, Shrubs and Ground Covers.
- .5 Section 31 23 10 - Excavation, Trenching and Backfilling.
- .6 Section 33 46 20 – Foundation and Underslab Drainage .
- .7 Section 033000 – Cast-in-Place Concrete.
- .8 Section 32 12 17 – Asphalt Paving.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m³).

1.3 EXISTING CONDITIONS

- .1 Contractor shall coordinate and obtain required Temporary Road Occupancy Permit.
- .2 Contractor is responsible to coordinate with Site Plans, Grading Plans, Structural Drawings and Specifications to determine depths of foundations and grade levels. Refer to Geotechnical Report and all site plans.
- .3 Contractor is responsible to quantify all on-site material to achieve design grades and is responsible for the importation or exportation of material from the site as required.
- .4 Refer to the Geotechnical Report for information on existing soil conditions and exceedances for material re-use or disposal.
- .5 Confirm exact locations of utility lines and buried objects prior to machine excavation or grading. In addition to all utility locates, contractor shall conduct engage a private locate company to conduct an underground scan for all areas of grading and excavation outside the property lines.”

1.4 PROTECTION

- .1 Protect and/or transplant existing trees, landscaping, natural features, bench marks, pavement, surface or underground utility lines which are to remain as directed by Consultant. If damaged, restore to original or better condition unless directed otherwise.

- .2 Maintain access roads to prevent accumulation of construction related debris on roads.

Part 2 Products

2.1 MATERIALS

- .1 Fill material to concrete paving areas and building pad: OPSS Granular B-Type 2 in accordance with of Section 31 23 10 - Excavating, Trenching and Backfilling.
- .2 Fill material to all driveway areas and asphalt; refer to 31 23 10 – Excavating, Trenching and Backfilling 2.1.4.
- .3 Excavated or graded material existing on site may be suitable to use as fill for grading work if approved by Consultant and uncontaminated type of existing materials meets the requirements herein for stated locations.

Part 3 Execution

3.1 STRIPPING OF TOPSOIL

- .1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected as determined by Consultant.
- .2 Examine the site and determine the extent of areas previously stripped and approximate depth of remaining topsoil, if any.
- .3 Strip the topsoil from the site as part of the work in this Section.
- .4 Remove top soil from areas to be excavated, paved and regraded.
- .5 Strip top soil when dry enough to prevent contamination of subgrade.
- .6 Contractor is responsible to quantify all on-site material to achieve design grades and is responsible for the importation or exportation of material from the site as required. Existing excess topsoil, if any, must be quantified before tender and may be re-used for general sodded areas as described in Section 32 91 21 Topsoil Placement and Grading.
- .7 Remove from site existing grass and vegetation and surplus top soil, if any.

3.2 BULK FILL & ROUGH GRADING

- .1 Refer to site drawings and related details and specification sections and note the initial permit will include rough grading only and not site servicing or foundation or building work.
- .2 Begin rough grading operation only after all sedimentation measures have been established and inspected.

- .3 The Contractor shall use the information shown on the survey, site plan, the grading plan, the Geotechnical Report as the basis for the "Existing Conditions" of the site and to determine the extent of engineered fill in the building area to be completed as part of the work.
- .4 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated. Ensure that rough grading operations to not promote water ponding in construction areas.
- .5 Perform construction grading to allow proper construction access to the work.
- .6 Grade to prevent water ponding on site during construction period. Create additional ditches, swales, slopes, ponds, etc. as required by Contract Documents and Municipal Authorities for control of drainage, sedimentation and topsoil retention.
- .7 Unless suitable uncontaminated fill or cut has been completed by previous contract, rough grade to following depths below finish grades:
 - .1 200 mm for grassed areas.
 - .2 400 mm for flowerbeds.
 - .3 450 mm for shrub beds.
 - .4 600 mm for heavy asphalt paving.
 - .5 540 mm for medium duty asphalt paving.
 - .6 275 mm for concrete walks.
 - .7 Maximum tolerance for rough grade elevation : .+- 25 mm
- .8 Slope rough grade away from building 1:50 2 % minimum.
- .9 Grade swales and ditches to depths as indicated.
- .10 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .11 Compact filled and disturbed areas to maximum dry density to ASTM D698, as follows:
 - .1 95% under landscaped areas.
 - .2 98 % under paved and walk areas.
- .12 Do not disturb soil within branch spread of trees or shrubs to remain.

3.3 TESTING

- .1 Inspection and testing of soil compaction will be carried out by testing agency hired by the School Board.
- .2 Tests to be conducted on imported soils and provided by a ULC designated laboratory prior to bringing to and placing on the site.
- .3 Costs of tests will be paid under a Cash Allowance. Refer to Section 01 11 00 – Summary of Work.

- .4 Submit testing procedure, frequency of tests, testing laboratory as designated by ULC or certified testing personnel to Consultant for approval and review.

3.4 SURPLUS MATERIAL

- .1 Remove surplus material and material unsuitable for fill, grading or landscaping as directed by Consultant and Municipal Authorities.
- .2 Include for removal and disposal of asphalt driveways, excess fill, rubble, etc. beyond property lines within work areas shown on site plans
- .3 Confirm locations on site prior to tender.

END OF SECTION

1. GENERAL

1.1. General Requirements

1. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda for all work.

1.2. Related Work

1. Aggregates Section 31 05 17

1.3. References

1. ASTM D4791-10, Test Method for Flat or Elongated Particles in Coarse Aggregate.
2. Ontario Provincial Standard Specification 1001.

2. PRODUCTS

2.1. Materials

1. Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.
2. Geotextile for siltation control fence shall be Class I non-woven geotextile fabric in accordance with OPSS 1860.

2.2. Source Quality Control

1. Inform Consultant of proposed source of aggregates and provide access for sampling at least four weeks prior to commencing production.
2. If, in opinion of Consultant, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
3. Advise Consultant four weeks in advance of proposed change of material source.
4. Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

3. EXECUTION

3.1. Installation

1. Silt Control Fence
 1. Install silt control fence along construction site perimeter including tee bars, geotextile filter fabric, clear stone along the upstream side of the fence in the instance the ground is frozen.

3.2. Maintenance

1. Maintain silt control fencing for the duration of the construction and replace as required until the site is stabilized.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Tree Protection Guidelines, City of Hamilton, Community Planning and Design Section, Planning Division, Planning and Economic Development Department, October 2010.

1.2 SCHEDULING

- .1 Obtain approval from Consultant of schedule indicating commencement of work.
- .2 No tree removals shall take place during migratory bird nesting period, between March 31st and August 31st of any calendar year, in accordance with Migratory Birds Convention Act.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide monthly written reports on maintenance during warranty period, to Consultant identifying:
 - .1 Maintenance work carried out.
 - .2 Development and condition of plant material.
 - .3 Preventative or corrective measures required which are outside Contractor's responsibility.

1.4 QUALITY ASSURANCE

- .1 Contractor
 - .1 The Contractor shall carry out all works in a true horticultural and arboricultural manner.
 - .2 The Contractor shall ensure that the hoarding is erected beyond the drip line of the trees and root systems of the trees to be protected.
 - .3 The Contractor shall supervise all work in this section including implementation and maintenance until final acceptance.
 - .4 The Contractor shall obtain approvals for suppliers, sub-contractors and all materials to be used in this section of Work.
 - .5 Comply with the City of Hamilton Tree Protection Guidelines, details and requirements for tree protection.
- .2 Maintenance
 - .1 Maintain all hoarding and accessories until final acceptance of Work. Maintenance includes all measures necessary to protect the existing trees.
 - .2 From time of acceptance by Consultant or Authority Having Jurisdiction to end of warranty period, perform following maintenance operations, if recommended by Consultant.
 - .1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.

- .2 Remove dead, broken or hazardous branches from plant material to proper arboricultural and horticultural standard practices.
- .3 Apply mulch over root zone, when directed by consultant.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Deliver hoarding in a timely manner prior to commencement of construction.
- .2 The Contractor shall not be responsible for the cost of replacements resulting from theft, vandalism, carelessness or neglect on the part of others or any other causes due to circumstances beyond his control.

Part 2 Products

2.1 MATERIALS

- .1 Fencing: Paige wire fencing, 1.2 m high.
- .2 Fasteners: 9ga. galvanized wire
- .3 Stakes: steel t-bars, 2200mm length
- .4 Filter Fabric: Terrafix 270R, or equivalent
- .5 Aggregate: 19mm clear stone
- .6 Burlap: Type 2, biodegradable
- .7 Conform to Municipal details and requirements.

Part 3 Execution

3.1 TREE REMOVAL AND INJURY PERMITS

- .1 Ensure necessary removal and injury permits are in place prior to the commencement of work.

3.2 INSPECTION

- .1 Verify areas to receive work in this section and report any conditions or defects encountered to the Consultant before Work commences.
- .2 Do not commence Work until hoarding has been approved.

3.3 PROTECTION AND PRESERVATION OF EXISTING VEGETATION

- .1 Tree protection to be installed prior to the start of any on site work.

- .2 Identify plants, condition of plants, and limits of root systems to be preserved to satisfaction of Consultant. Report any discrepancy in plant condition and preservation status to prior to any removal.
- .3 All existing trees which are to remain shall be fully protected with hoarding to height 1.2 m high, i.e. erected beyond their "dripline" to the satisfaction of the Consultant. Groups of trees and other existing plantings to be protected, shall be treated in a like manner with hoarding around the entire clump(s). Areas within the protective fencing shall remain undisturbed and shall not be used for the storage of building materials or equipment.
- .4 No rigging cables shall be wrapped around or installed in trees and surplus soil, equipment, debris or materials shall not be placed over root systems of the trees within the protective fencing. No contaminants will be dumped or flushed where feeder roots of trees exist.
- .5 No construction activity including grade changes, surface treatments or excavations of any kind are permitted within the tree protection zone. No root cutting is permitted. No storage of materials or fill is permitted within the tree protection zone. No movement or storage of vehicles or equipment is permitted within the tree protection zone.
- .6 The contractor shall take every precaution necessary to prevent damage to trees or shrubs to be retained.
- .7 Where limbs or portions of trees are removed to accommodate construction work, they will be removed carefully in accordance with accepted arboricultural practice by an ISA certified arborist at the contractor's expense.
- .8 Where root systems of trees are exposed directly adjacent to or damaged by construction work, they shall be trimmed neatly and the area backfilled with appropriate material to prevent desiccation. Prune tree(s) to restore the balance between roots and top growth or to restore the appearance of the tree(s).
- .9 Trees that have died due to improper protection and maintenance or have been damaged beyond repair, shall be removed and replaced by the Contractor at this own expense with trees of a size and species as approved by the Municipality.
- .10 If grades around trees to be protected are likely to change, the Contractor shall be required to take such precautions as dry welling, retaining walls and root feeding, as approved by the Consultant.

3.4 FINAL ACCEPTANCE

- .1 Remove tree protection and hoarding prior to final acceptance.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 31 23 13 - Rough Grading.
- .3 Section 31 23 10 – Excavation, Trenching and Backfilling.
- .4 Section 03 30 00 – Cast-in-Place Concrete.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.5, Low Flash Petroleum Spirits Thinner.
 - .2 CAN/CGSB-1.74, Alkyd Traffic Paint.
- .3 Government of Québec, Minister of Transport
 - .1 Cahier des charges et devis généraux (CCDG).
- .4 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 302, Construction Specification for Primary Granular Base.
 - .2 OPSS 310, Construction Specification for Hot Mixed, Hot Laid Asphaltic Concrete Paving and Hot Mix Patching.
 - .3 OPSS 314, Construction Specification for Untreated Granular, Subbase, Base, Surface Shoulder and Stockpiling.
 - .4 OPSS 1010, Material Specification for Aggregates, Granular A, B, M and Select Subgrade Material.
 - .5 OPSS 1103, Material Specification for Emulsified Asphalt.
 - .6 OPSS 1150, Material Specification for Hot Mixed, Hot Laid Asphalt Concrete.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Consultant, samples of material for sieve analysis at least 2 weeks before beginning Work.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .2 Place materials defined as hazardous or toxic in designated containers.

- .3 Divert unused aggregate materials from landfill to facility for reuse as approved by Consultant.
- .4 Dispose of unused paint and paint thinner materials at official hazardous material collections site as approved by Consultant.
- .5 Fold up metal banding, flatten and place in designated area for recycling.
- .6 Do not dispose of unused paint and paint thinner material into sewer system, into streams, lakes, onto ground or in other location where it will pose health environmental hazard.
- .7 Divert unused asphalt from landfill to facility capable of recycling materials.

1.5 EXTENDED WARRANTY

- .1 Submit a warranty for asphalt paving installation, covering materials and labour and the repair or replacement of defective work in accordance with the Contract, but for two (2) years total.

Part 2 Products

2.1 MATERIALS

- .1 Sub-Base: Suitably compacted native material only where approved density and drainage is achieved. Otherwise in upfill locations use Fill type "B" where required to reach design elevations.
- .2 Base: 50 mm and 19 mm graded, crusher run limestone to depths indicated on AD details.
- .3 Heavy Duty Pavement for Parking and Driveways: Hot mix, hot laid asphaltic concrete HL8 and HL3, mixture conforming to O.P.S.S. #1150.05.
- .4 Medium Duty Pavement for Play Areas, Parking (where indicated on Site Plan) and Walkways: Hot mix, hot laid asphaltic concrete HL8 and HL3, mixtures conforming to O.P.S.S. #1150.05.
- .5 Light Duty Pavement for Walkway: Hot mix, hot laid asphaltic concrete HL3, mixtures conforming to O.P.S.S. #1150.05.
- .6 Joint Painting Material: SS-1 emulsion in accordance with O.P.S.S. #1103.05.

Part 3 Execution

3.1 PREPARATION

- .1 Regard locations and instructions on drawings. Report any discrepancies or questions to the Consultant prior to proceeding with the work. In particular pay attention to the exact delineation of all edges of pavement and types of pavement;
- .2 Set out work in accordance with lines and levels shown on Drawings. Maintain such lines and levels through duration of work. Ensure positive drainage toward catch basins is maintained in all areas.
- .3 Compact sub-grade to a minimum of 98% Standard Proctor density.

- .4 Paint exposed edge of asphaltic joints, edge of manhole and catchbasin frames, curbs and similar items with SS-1 emulsion.

3.2 INSTALLATION

- .1 Inspect site grades prior to installation. Review the precise grade requirements required on the grading plan. Review with the Consultant prior to installation if any conditions exist that may cause deviations from grades shown on Drawings. Coordinate catchbasin elevations with those shown on Mechanical site plan.

.2 Pavement Section:

- .1 Heavy Duty (HD): at all parking and driveway areas (refer also to AD 200)
 - .1 minimum 450 mm compacted thickness of 50 mm crusher run limestone or OPSS Granular B Type II, compacted to 100% Standard Proctor Maximum Dry Density (SPMDD), ASTM-D698 .
 - .2 150 mm compacted thickness Base course of 19 mm crusher run limestone or OPSS Granular A compacted to 100% SPMDD.
 - .3 80 mm compacted thickness of granular asphalt HL8.
 - .4 40 mm compacted thickness of granular asphalt HL3.
- .2 Light and/or Medium Duty (LD & MD): at rear and side yard play and walkway areas noted on Site Plans.(refer also to AD 200)
 - .1 300 mm compacted thickness of 50 mm crusher run limestone Sub-Base or OPSS Granular B Type II, compacted to 100% Standard Proctor Maximum Dry Density (SPMDD), ASTM-D698.
 - .2 150 mm compacted thickness Base course of 19 mm crusher run limestone or OPSS Granular A, compacted to 100% SPMDD..
 - .3 50 mm compacted thickness of granular asphalt HL8.
 - .4 40 mm compacted thickness of granular asphalt HL3.

.3 Placing Granular Materials:

- .1 Exercise due care at all times to prevent granular materials from being contaminated by clay or other types of deleterious materials.
- .2 Place materials immediately after sub-grade is inspected by the Architect and as follows:
 - .1 To required width and thickness indicated on Drawings in layers not exceeding 100 mm compacted thickness crusher run limestone?
 - .2 Grade each layer and compact to a minimum 100% standard Proctor density to a smoother surface conforming to required cross-section.
- .4 Finished surface of granular material must not deviate more than 10 mm from designed grade.

.5 Placing Asphaltic Pavement:

- .1 Obtain Consultant's inspection of compacted granular base before commencing asphalt paving.
- .2 Air temperature during placing of mixture must be minimum 7 deg. C and rising. Temperature of mixture when spread must be not less than 120 deg. C nor more

than 150 deg. C. Do not increase temperature of mixture to offset long distance hauling.

- .3 Compact asphaltic mixture as soon as it can bear roller without undue displacement and hairline cracking and continue until all roller marks are eliminated. Speed of roller must at all times be slow enough to avoid displacement of mixture. Keep roller wheels slightly moistened by water to prevent adhesion of mixture. Excess water will not be permitted. Compact mixture with hot tampers in locations that are not easily accessible to machine roller.
- .4 Rolling Procedure:
 - .1 Initial and final rolling must be accomplished using self-propelled Class "B" roller.
 - .2 Intermediate rolling must be carried out using self-propelled Class "C" roller or "D" roller. Intermediate roller must follow breakdown roller as closely as possible.
- .5 Upon completion of compaction each pavement course must be:
 - .1 Smooth and true to crown and grade with variation not more than 6 mm from thickness shown on Drawing. Do not place any asphaltic course less than 25 mm thick nor more than 75 mm thick.
 - .2 Free from depressions exceeding 3 mm as measured with 3 m straight edge paralleling centre line of driveways/aisles.
 - .3 Compacted to a density not less than 97% Marshall.

.6 Joints:

- .1 Cut back bituminous course to its full depth in straight or curved lines as required to expose fresh, straight, vertical surface. Remove broken and loose material.
- .2 Asphalt must be placed in such a manner that joint must not be allowed to cool before adjacent asphalt course is applied.
- .3 Where paving is comprised of two or more courses, joints must overlap by not less than 600 mm.
- .4 Carefully place and compact hot asphaltic material against joints. Correct any unsatisfactory joint before proceeding with work.
- .5 Feathering of joints will not be permitted.

.7 Inspection and Testing:

- .1 Refer to Section 01 11 00 – Summary of Work, section 1.29.
- .2 Field inspections during installation, and core samples of all asphalt areas will be taken as part of Inspection and Testing. **If tests show asphalt to be substandard to that specified, all asphalt shall be removed and replaced at the Contractor's expense. Cash credits will not be accepted for work which does not fully comply with drawings and specifications.**

3.3 CERTIFICATION OF GRADES

- .1 The Contractor is required to provide as-constructed elevations of the parking area to verify that the parking lot has been constructed in accordance with the contract drawings.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 10 01 Landscape Concrete Forming and Accessories
- .2 Section 03 30 01 Landscape Cast-in-Place Concrete

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C117-[13] , Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136/C136M-[14] , Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM C 309 [03] , Liquid Membrane Forming Compounds for Curing Concrete.
 - .4 ASTM D1751, Standard Specification For Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - .5 ASTM D698-[12e2] , Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600 kN-m/m³).
- .2 CSA Group
 - .1 CSA-A23.1-[14] /A23.2-[14] , Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete, Including Update No. 1 [2015] .
 - .2 CSA B651-[2012] Accessible Design for the Built Environment.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, and limitations.
- .2 Inform Consultant of proposed source of materials and provide access for sampling minimum 4 weeks prior to commencing work.
- .3 If materials have been tested by independent testing laboratory within previous 2 months and have passed tests equal to requirements of this specification, submit test certificates from testing laboratory showing suitability of materials for this project.

Part 2 Products

2.1 MATERIALS

- .1 Concrete mixes and materials: in accordance with Section 03 30 01 – Landscape Cast-in-Place Concrete.

- .2 Reinforcing steel:
 - .1 For paved surfaces:
 - .1 Pedestrian Concrete: WWM 152x152 MW11.1
 - .2 Vehicular Concrete: WWM 152x152 MW18.7
 - .2 For Raised Concrete Edges: three #10M, or two #15M, epoxy coated continuous bars, placed as indicated on drawings.
- .3 Joint filler: in accordance with Section 03 30 01- Landscape Cast-in-Place Concrete.
- .4 Granular base:
 - .1 Granular 'A' in accordance with OPSS 101.05.02.
- .5 Non-staining mineral type form release agent: chemically active release agents containing compounds reacting with free lime to provide water-soluble soap.
- .6 Curing Agent: to ASTM C309, Type 1.
- .7 Expansion Joint Filler: Premoulded bituminuous fibre board, conforming to ASTM D1751.
- .8 Tactile Walking Surface Indicators: (TWSI): Cast iron, AODA compliant.
 - .1 Locations as shown on drawings.
 - .2 Exterior Advantage Tactile System, Supplied by Kinesik Engineered Products (www.kinesik.ca).
 - .1 Finish: Dual-Layered Electrocoating & Powdercoat Paint System. Colour to be onyx black.
 - .2 Quantity: as required to meet AODA compliance for accessible curb ramps.

Part 3 Execution

3.1 GRADE PREPARATION

- .1 Do grade preparation work in accordance with Section 31 23 33 - Excavating, Trenching and Backfilling or geotechnical report.
- .2 Construct embankments using excavated material free from organic matter or other objectionable materials.
 - .1 Dispose of surplus and unsuitable excavated material off site.
- .3 Place fill in maximum 150mm layers and compact to minimum 98% of maximum dry density to ASTM D698.

3.2 GRANULAR BASE

- .1 Obtain Consultant's approval of subgrade before placing granular base.
- .2 Place granular base material to lines, widths, and depths as indicated.
- .3 Compact granular base in maximum 150 mm layers to minimum 98 % of maximum density to ASTM D698.

3.3 CONCRETE

- .1 Obtain Consultant's approval of granular base and reinforcing steel prior to placing concrete.
- .2 Do concrete work in accordance with Section 03 30 01- Landscape Cast-in-Place Concrete.
- .3 Concrete Paving:
 - .1 Immediately after floating, give concrete paving surface uniform broom finish to produce regular corrugations not exceeding 2mm deep, by drawing broom side to side across sidewalk.
 - .2 Do not radius or tool edges of joints.
- .4 Provide raised concrete edging as indicated on drawings.
 - .1 Plywood board formed finish.
 - .2 Top to receive smooth steel trowel finish.
 - .3 Keep form joints to a minimum.
- .5 Provide flush artificial turf concrete edging as indicated on drawings.
 - .1 Formed finish.
 - .2 Top to receive non-slip wood float finish.
 - .3 Keep form joints to a minimum.
- .6 Slip-form pavers equipped with string line system for line and grade control may be used if quality of work acceptable to Consultant can be demonstrated. Hand finish surfaces when directed by Consultant.

3.4 TOLERANCES

- .1 Finish surfaces to within 3mm in 3m as measured with 3m straightedge placed on surface.

3.5 EXPANSION AND CONTRACTION JOINTS

- .1 Sawcut transverse contraction joints after concrete has set, at intervals of shown on drawings.
- .2 Install expansion joints as indicated on drawings or at intervals of no more than 6m.
- .3 When sidewalk adjacent to curb, make joints of curb, gutters and sidewalk coincide.
- .4 Install expansion joint where new concrete paving abuts existing.

3.6 ISOLATION JOINTS

- .1 Install isolation joints around manholes, catch basins and area drains, and along length adjacent to concrete curbs, concrete walls, buildings, or permanent structures.
- .2 Install joint filler in isolation joints in accordance with Section 03 30 01 – Landscape Cast-in-Place Concrete.
- .3 Seal isolation joints with sealant approved by Consultant.

3.7 TACTILE WALKING SURFACE INDICATORS

- .1 Install tactile walking surface indicators at curb ramp edges, where indicated on drawings and in accordance with local municipal by-laws and AODA.

3.8 CURING

- .1 Cure concrete by adding moisture continuously in accordance with CSA-A23.1/A23.2 to exposed finished surfaces for minimum 1 day after placing, or sealing moisture in by curing compound.
- .2 Where burlap used for moist curing, place two prewetted layers on concrete surface and keep continuously wet during curing period.
- .3 Apply curing compound evenly to form continuous film, in accordance with manufacturer's requirements.

3.9 BACKFILL

- .1 Allow concrete to cure for 7 days prior to backfilling.
- .2 Backfill to designated elevations with material as directed by Consultant.
 - .1 Compact and shape to required contours as indicated.

3.10 CLEANING

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 32 13 13 Concrete Paving and Edges

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C136-[13] , Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .2 ASTM C140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
 - .3 ASTM C936, Standard Specification for Solid Concrete Interlocking Paving Units.
 - .4 ASTM C979/C979M-[10] , Standard Specification for Pigments for Integrally Colored Concrete.
 - .5 ASTM C1645 Standard Test Method for Freeze-thaw and De-icing Salt Durability of Solid Concrete Interlocking Paving Units
- .2 CSA Group
 - .1 CSA A23.1/A23.2-[09] , Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A179-[04(R2009)] , Mortar and Grout for Unit Masonry.
 - .3 CSA A231.1/A231.2-[06(R2010)] , Precast Concrete Paving Slabs/Precast Concrete Pavers.
 - .4 CSA A283-[06(R2011)] , Qualification Code for Concrete Testing Laboratories.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for precast concrete unit paving and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit full size samples of each paver type, thickness, colour and finish that indicate the range of colour variation and texture expected upon project completion for consultant approval.
 - .2 Accepted samples become the standard of acceptance for the product produced.
- .4 Test and Evaluation Reports:
 - .1 Submit following sampling and testing data:
 - .1 Sieve analysis for gradation of bedding and joint material.

- .2 Unit paver sampling and testing.
- .3 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company or person specializing in precast concrete paver installations of similar complexity, size and material with 5 documented years of experience.
- .2 Mock-ups:
 - .1 Construct 3 x 3 m area mock-up.
 - .2 Mock-up will be used:
 - .1 To judge quality of work, substrate preparation, operation of equipment and material application.
 - .2 To determine surcharge of bedding layer, joint sizes, lines, laying patterns, colours, texture and levelness.
 - .3 Locate mock-up where directed by Consultant.
 - .4 Allow 48 hours for inspection of mock-up before proceeding with work.
 - .5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect materials free from mud, dirt, and other foreign materials.
 - .3 Store and protect precast concrete units from nicks, scratches, and blemishes.
 - .4 Replace defective or damaged materials with new.
- .4 Coordinate delivery and paving schedule to minimize interference with normal use of streets and sidewalks adjacent to paver installation.
- .5 Prevent joint and sand setting bed sand from exposure to rainfall, or removal by wind with secure, waterproof covering.

1.6 PROJECT / SITE CONDITIONS

- .1 Environmental Requirements:

- .1 Install pavers only on unfrozen setting bed aggregate materials
- .2 Install pavers only on unfrozen base or sub-base aggregate materials
- .3 Install base or subbase only over unfrozen subgrade
- .4 Install setting bed sand or pavers only when there is no heavy rain or snowfall.
- .5 Install polymeric joint sand only when ambient temperature is above 5°C, under dry conditions with no rain forecast for 24 hours and when surface of pavement is completely dry.

1.7 CONCRETE PAVER OVERAGE AND ATTIC STOCK

- .1 Provide a minimum of 5% additional material for overage to be used during construction.
- .2 Contractor to provide a minimum of 10 sq. m of each product and size used to owner for maintenance and repair. Furnish pavers from the same production run as installed materials.

Part 2 Products

2.1 CONCRETE PAVERS

- .1 Concrete pavers to be manufactured by Techo-Bloc or approved equivalent.
- .2 Concrete Paver Type 1: Industria Granitex Commercial
 - .1 Size: 300x600x100mm
 - .2 Colour: Shale Grey
 - .3 FinishL HD2 Granitex
 - .4 Layout: Running ½ lap
- .3 Concrete Paver Type 2: Industria Granitex Commercial
 - .1 Size: 150x300x100mm
 - .2 Colour: Shale Grey
 - .3 FinishL HD2 Granitex
 - .4 Layout: Running ½ lap
- .4 Pavers shall meet the minimum material and physical properties set forth in ASTM C936.
 - .1 Average compressive strength 8000psi (55 MPa) with no individual unit under 7,200 psi (50 MPa)
 - .2 Average absorption of 5% with no greater than 7% when tested according to ASTM C140.
 - .3 Conforming to ASTM C 1645 when tested for freeze-thaw requirements.
 - .4 Height tolerances +/- 3.2mm.
- .5 Pigment in concrete pavers: to ASTM C979/C979M.
- .6 Maximum allowable breakage of product is 5%.

2.2 JOINT MATERIAL

.1 Unit Paving Joint Sand

- .1 Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
- .2 Do not use limestone screenings, stone dust, or sand for the Joint Sand material that does not conform to the grading requirements of ASTM C 33.
- .3 Utilize sands that are as hard as practically available where concrete pavers are subject to vehicular traffic.
- .4 Gradation as shown in Table below:

Table – Joint Sand Gradation Requirements for Joint Sand		
ASTM C144		
Sieve Size	Natural Sand Percent Passing	Manufactured Sand Percent Passing
No. 4 (4.75 mm)	100	100
No. 8 (2.36 mm)	95 to 100	95 to 100
No. 16 (1.18 mm)	70 to 100	70 to 100
No. 30 (0.600 mm)	40 to 75	40 to 75
No. 50 (0.300 mm)	10 to 30	20 to 40
No. 100 (0.150 mm)	2 to 15	10 to 25
No. 200 (0.075)	0 to 1	0 to 10

- .5 Polymeric Joint Sand:
 - .1 Product as recommended by unit paver manufacturer.
 - .2 Colour to be selected from colour chart by the consultant.
 - .3 Provide Polymeric Joint Sand meeting the minimum material and physical properties as follows:
 - .1 Compression Strength: proven resistance to compression of 550 PSI after drying for 7 days under controlled conditions (73°F (23°C) at 50% humidity).
 - .2 Gradation as shown in Table 1 above.

2.3 SETTING BED

.1 Unit Paving Setting Bed Sand

- .1 Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
- .2 Do not use limestone screenings, stone dust, or sand material that does not conform to the grading requirements of ASTM C 33.
- .3 Do not use mason sand or sand conforming to ASTM C 144.

- .4 Utilize sands that are as hard as practically available where concrete pavers are subject to vehicular traffic.
- .5 Conform to the grading requirements of ASTM C 33 with modifications as shown in Table below:

Table – Setting Bed Sand	
Gradation Requirements for Setting Bed Sand	
ASTM C 33	
Sieve Size	Percent Passing
3/8 in (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (0.600 mm)	25 to 60
No. 50 (0.300 mm)	10 to 30
No. 100 (0.150 mm)	2 to 10
No. 200 (0.075)	0 to 1

2.4 CONCRETE BASE

- .1 Unit Paving Concrete Base
 - .1 Refer to Section 32 13 13 Concrete Paving and Edges.
- .2 Drainage holes: 6mm clear chip aggregate

2.5 EDGE RESTRAINTS

- .1 Edge restraints shall be aluminum
 - .1 Aluminum Original#150 as manufactured by Brickstop.
 - .2 Approved equivalent.

2.6 CLEANING COMPOUND

- .1 Clear, organic solvent, designed and recommended by manufacturer for cleaning concrete pavers of contamination encountered.
- .2 Acid based chemical detergent, designed and recommended by manufacturer for removal of contamination encountered on pavers.

2.7 SEALING COMPOUND

- .1 Sealing compound to be used only as recommended by manufacturer where applicable.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for precast concrete unit paving installation in accordance with manufacturer's written instructions and requirements for installation tolerances and other conditions affecting performance prior to placing concrete pavers.
 - .1 Unit Paving on Concrete Base:
 - .1 Verify the Concrete Base has cured.
 - .2 Verify the Concrete base thickness, strengths, surface tolerances and elevations conform to the specified requirements.
 - .1 Verify that top of concrete surface (top of base) does not exceed plus or minus 10mm of grade over 3m straightedge.
 - .3 Ensure that concrete surface has no standing water is present during installation.
 - .4 Provide written density test results for soil subgrade, concrete underlayment psi testing to the Owner and Consultant.
 - .5 Verify location, type, and elevations of edge restraints, concrete curbs, concrete collars around utility structures and drainage inlets.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.
 - .1 Beginning Paver installation signifies acceptance of base and edge restraint conditions.

3.2 INSTALLATION OF EDGE RESTRAINTS

- .1 Install restraints true to grade, in accordance with manufacturer's recommendations and as shown on drawing details.

3.3 SETTING BED

- .1 Unit Paving:
 - .1 Provide, spread and screed Setting Bed Sand evenly over the Concrete base.
 - .1 Protect screeded Setting Bed Sand from being disturbed by either pedestrian or vehicular traffic.
 - .2 Screed only the area which can be covered by pavers in one day.
 - .2 Keep moisture content constant and density loose and constant until Concrete Pavers are set and compacted.
 - .3 Screed Setting Bed Sand using either an approved mechanical spreader (e.g.: an asphalt paver) or by the use of screed rails and boards. Maintain in a loose condition slightly ahead of the paving units and fully protect against incidental compaction following screeding. Loosen compacted sand by rain or screeded sand left overnight before further paving units are placed.

- .4 Inspect the Setting Bed Sand course prior to commencing the placement of the Concrete Pavers. Acceptance of the Setting Bed Sand occurs with the initiation of Concrete Paver placement.

3.4 INSTALLATION OF CONCRETE PAVERS

- .1 Replace Concrete Pavers with chips, cracks, voids, discolorations, and other defects that might be visible in finished work.
- .2 Mix Concrete Pavers from a minimum of three (3) bundles simultaneously drawing the paver vertically rather than horizontally, as they are placed, to produce uniform blend of colors and textures.
- .3 Exercise care in handling face mix concrete pavers to prevent surfaces from contacting backs or edges of other units.
- .4 Provide Concrete Pavers using laying pattern as indicated. Adjust laying pattern at pavement edges such that cutting of edge pavers is minimized. Cut all pavers exposed to vehicular tires no smaller than one-third of a whole paver.
- .5 Use string lines or chalk lines on Setting Bed to hold all pattern lines true.
- .6 Set surface elevation of pavers 1/8 in. (3 mm) above adjacent drainage inlets, concrete collars or channels.
- .7 Place units hand tight against spacer bars. Adjust horizontal placement of laid pavers to align straight.
 - .1 When installation is performed with mechanical equipment, use only unit pavers with spacer bars on sides of each unit.
- .8 Provide space between paver units of 1/32 in. (1 mm) wide to achieve straight bond lines.
- .9 Prevent joint (bond) lines from shifting more than $\pm 1/2$ in. (± 13 mm) over 50 ft. (15 m) from string lines.
- .10 Fill gaps between units or at edges of the paved area that exceed 3/8 inch (10 mm) with pieces cut to fit from full-size unit pavers.
- .11 Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.
- .12 Prevent all traffic on installed Concrete Pavers until joint material has been vibrated into joints. Keep skid steer and forklift equipment off newly laid Concrete Pavers that have not received initial compaction and Joint material.
- .13 Vibrate Concrete Pavers into leveling course with a low-amplitude plate vibrator capable of a to 5000-lbf (22-kN) compaction force at 80 to 90 Hz. Perform at least three passes across paving with vibrator. Vibrate under the following conditions:
 - .1 After edge pavers are installed and there is a completed surface or before surface is exposed to rain.
 - .2 Compact installed Concrete Pavers to within 6 feet (1.8 meters) of the laying face before ending each day's work. Cover Concrete Pavers that have not been

compacted and leveling course on which pavers have not been placed, with nonstaining plastic sheets to prevent Setting Bed from becoming disturbed.

- .14 Protect face mix Concrete Paver surface from scuffing during compaction by utilizing a urethane pad.

3.5 INSTALLATION OF JOINT MATERIAL

- .1 Remove any cracked or structurally damaged Concrete Pavers and replace with new units prior to installing Joint material.
- .2 Provide, spread and sweep joint material into joints immediately after vibrating pavers into Setting Bed course until full. Vibrate pavers and add Joint material until joints are completely filled, then remove excess material. This will require at least 4 passes with a plate compactor.
- .3 Remove excess Joint material broom clean from surface when installation is complete.
- .4 Polymeric Joint Sand
 - .1 Install polymeric joint sand per manufacturers recommended instructions.

3.6 FIELD QUALITY CONTROL

- .1 Verify final elevations for conformance to the drawings after sweeping the surface clean.
 - .1 Prevent final Concrete Paver finished grade elevations from deviating more than $\pm 3/8$ in. (± 10 mm) under a 10 ft (3 m) straightedge or indicated slope, for finished surface of paving.
- .2 Paver-to-Paver Lippage:
 - .1 No greater than 3 mm (1/8 inch) difference in height between adjacent pavers.

3.7 REPAIRING, CLEANING AND SEALING

- .1 Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.
- .2 Cleaning: Remove excess dirt, debris, stains, grit, etc. from exposed paver surfaces; wash and scrub clean.
 - .1 Clean Concrete Pavers in accordance with the manufacturer's written recommendations.

3.8 PROTECTION

- .1 Protect completed work from damage due to subsequent construction activity on the site.

END OF SECTION

Part 1 General

1.1 RELATED WORK

- .1 Section 32 13 13 Concrete Paving and Edges

1.2 STANDARD PRODUCT AND MATERIAL SPECIFICATIONS

- .1 American Standard Testing Materials, (ASTM)
 - .1 ASTM F1015 - Standard Test Method for Relative Abrasiveness of Synthetic Turf Playing Surfaces.
- .2 Synthetic Turf Council Suggested Guidelines for the Essential Elements of Synthetic Turf Systems

1.3 CONSTRUCTION SUBMITTALS

- .1 Product Data: For each type of product specified.
- .2 Shop Drawings: Provide installation details including roll and seaming layout, methods of attachment and details at penetrations and terminations
 - .1 Show layout of marking plan if any, indicating details for specified activity areas.
- .3 Samples: For each type of synthetic turf surfacing indicated.
 - .1 Minimum 12-by-12-inch- square sample of synthetic turf surface with tufted perimeter line and carpet seam.
- .4 Manuals:
 - .1 Submit the synthetic turf Warranty package and a computer diskette (CD) containing the operation and maintenance manual to the Consultant for approval prior to commencing with the installation. Provide descriptions of any equipment required or recommended for maintenance and repair, citing specific vendors for each unit. Provide a separate section stating the approved activity usage for the turf and activities not recommended, all relative to the Warranty. Include maintenance recommendations including small repair procedures, minor seam repair, discussion of precautions to be practiced, general maintenance, and uses to avoid to protect turf surface and to maintain installation's Warranty.
- .5 Site Acceptance: Submit a letter confirming that an inspection of the finished sub-grade has been conducted, noting all discrepancies, problems and conflicts. If no problems are found, this shall be so indicated. The Contractor's inspection shall include acceptance of the base materials for both planarity and permeability, as well as any other factors the Contractor considers relevant to the synthetic turf installation. The Contractor's certification letter shall also include acceptance of the field subgrade and base as being totally suitable for the application of the Work, with the assurance that the synthetic turf installation work carried out on the play area

subgrade and base will result in a "superior quality" play surface, fully warranted for the period and conditions specified herein.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Packing and Shipping: Deliver products in original unopened packaging with legible manufacturer's identification.
- .2 Storage and Protection:
 - .1 Comply with manufacturer's recommendations.
 - .2 Store in dry place out of direct sunlight.
 - .3 Protect from damage by the elements and construction procedures.

1.5 WARRANTY OF SYNTHETIC TURF SYSTEM

- .1 Manufacturer's Warranty: Submit manufacturer's standard published limited warranty form in which manufacturer agrees to repair or replace components of synthetic turf surfacing installation installed by manufacturer-certified Installer that fail in materials under normal use and maintenance, or provide other relief, within specified warranty period.
 - .1 Failures include ultraviolet degradation, backing integrity, more than 50 percent loss of face fiber, and loss of tuft bind strength.
 - .2 Warranty Period: Life of product.
- .2 Installer Project Warranty: Submit synthetic turf surfacing Installer's warranty, signed by Installer, covering the Work of this Section, including installation of all components of synthetic turf surfacing system, for the following warranty period:
 - .1 Warranty Period: Two years from date of Substantial Completion.

Part 2 Products

2.1 GENERAL

- .1 All backing layers and coatings shall be firmly bonded together. Coating materials must be completely cured and bonded to the other backing layers. Synthetic turf panels or rolls that do not meet this requirement will be rejected.
- .2 The entire system shall be resistant to weather, insects, rot, mildew, and fungus growth, and be non-allergenic and non-toxic. The entire system shall be constructed to maximize dimensional stability, to resist damage and normal wear and tear from its designated use, and to minimize ultraviolet degradation.
- .3 All adhesives used in bonding the system together shall be resistant to moisture, bacterial and fungus attacks, and resistant to ultraviolet rays at any location upon installation.

2.2 SYNTHETIC TURF

- .1 Play Premium as manufactured by SynLawn or approved equivalent.
 - .1 Colour to be selected from colour chart.
- .2 Complete surfacing system, consisting of delustered UV-stabilized antimicrobial synthetic yarns bound to water-permeable bio-based primary and secondary backing. IPEMA-certified. Non-abrasive blades with low surface temperature. Anti-Static and Ultra Violet reflective pigment-enhanced.

2.3 SYNTHETIC TURF INFILL

- .1 T°Cool Synthetic Turf Cooling Infill as manufactured by T°Cool (T:404-490-3554).

2.4 GLUE, SEAMING FABRIC AND THREAD

- .1 Per manufacturer's recommendations, suitable for application.

2.5 TURF SPIKES

- .1 Per manufacturers approved fasteners.

2.6 NAILER BOARD

- .1 Per manufacturer's approved nailer / edger board.

2.7 FLUSH CONCRETE CURBS

- .1 Refer to Section 32 13 13 Concrete Paving and Edges.

2.8 GRANULAR BASE

- .1 High Performance Bedding: 3/8" clear limestone with no fines.
- .2 Granular 'A': In accordance with OPSS.PROV 1010 (2013)

2.9 SYNTHETIC TURF FABRIC SURFACE

- .1 Rolls that do not lay evenly and with full dimension width will be rejected.

2.10 SYNTHETIC TURF SYSTEM MATERIAL COMPONENTS

- .1 Pile fibers shall resemble freshly-grown natural grass in appearance, texture and colors.

Part 3 Execution

3.1 CERTIFICATION OF SYNTHETIC TURF BASE INSTALLATION

- .1 The Contractor shall perform an inspection of the synthetic turf base and submit written certification of acceptance of the base for the installation of the synthetic turf system. The inspection and certification shall be completed at least two working days prior to turf installation. When planning the installation schedule, the Contractor shall allow for minor synthetic turf base restoration work to be performed by the synthetic turf base contractor.
- .2 Summary of certification shall include, but not be limited to:
 - .1 Acceptance of the base construction "finish surfaces" (planarity, granular surface stability, etc.) as being totally suitable for the application of Work specified under this section, and with the assurance that the synthetic turf installation work carried out on the field subgrade and base will result in a "superior quality" play surface, fully warranted for the period and conditions specified herein.
 - .2 Verification and certification of the infiltration and permeability rates of the permeable base and subdrainage as applying to the Warranty.
- .3 All discrepancies between the required materials, application and tolerance requirements noted by the Contractor shall be brought immediately to the attention of the Consultant.

3.2 INSTALLATION - GENERAL

- .1 The installation shall be performed in full compliance with approved Shop Drawings.
- .2 Only trained technicians, skilled in the installation of playground caliber synthetic turf systems working under the direct supervision of the approved installer supervisors, shall undertake any cutting, sewing, gluing, shearing, top-dressing or brushing operations.
- .3 The designated Supervisory personnel on the project must be certified, in writing by the turf manufacturer, as competent in the installation of this material, including sewing seams and proper installation of the Infill mixture.

3.3 SYNTHETIC TURF INSTALLATION

- .1 Perform all Work in strict accordance to the drawings, shop drawings and manufacturer's Specifications and instructions.
- .2 Verification: The Contractor is responsible for inspecting, verifying, and accepting all installed Work of this section.
- .3 Environmental Conditions: Do not apply adhesive materials when:
 - .1 Ambient air temperature is below 10 degrees C.
 - .2 Material temperatures are below 10 degrees C.
 - .3 Rain is falling or pending
 - .4 Conditions exist, or are pending, that will be unsuitable to the installation of

the system.

.4 Preparation:

- .1 Flush Concrete Edge Containment: Refer to Section 32 13 13 Concrete Paving and Edges.
- .2 Accept base onto which the synthetic turf surfacing system and the anchoring system are to be applied, as specified above.
- .3 Immediately prior to application of the synthetic turf, the base shall be thoroughly cleaned of all foreign material, soil, or any other substances that may be detrimental to permeability and the installation of the turf system.

.5 Artificial turf panel seams shall be sewn. Other than extension inlays, seams secured by other means including gluing are unacceptable. Installation shall be 99% sewn.

- .1 Minimum gluing will only be permitted to repair problem areas, corner completions.
- .2 Seams shall be flat, tight, and permanent with no separation or fraying.

.6 Infill Materials:

- .1 Infill materials shall be applied in numerous thin lifts. The turf shall be brushed as the mixture is applied. The infill material shall be installed to a depth determined by the manufacturer.

3.4 INSPECTION OF MATERIALS

- .1 Prior to installation, and immediately upon delivery of synthetic turf system materials to the Project site, the Contractor shall inspect material as follows:
 - .1 General inspection for damaged or defective items;
 - .2 Measure turf pile height and thickness of each roll;
 - .3 Reject damaged materials and all materials out of tolerance with the Specifications.
 - .4 Conduct such additional inspections as are required to ensure quality control is maintained to a high level.
- .2 After installation, inspect Project area for acceptable seaming, adhesive bonding, uniformity of color of turf, bubble-free surface smoothness as laid, insert installations, edge details. Remove and/or repair deficient workmanship prior to requesting the Consultant's inspection pursuant to completion and acceptance of the Work.

3.5 CLEANING

- .1 The Contractor shall remove all excess materials of all types, equipment, debris, etc., from the site immediately after completion of the Work. Remove all stains and other blemishes from all finished surfaces. Leave Work in a clean, new appearing condition, ready for use by Owner.
- .2 The Contractor shall inspect the entire synthetic turf area with a hand held metal detector to identify any construction materials or tools left on the field. All such materials shall be removed prior to Owner occupancy of the site.

3.6 PROTECTION

- .1 Adequate protection of materials and Work from damage will be the responsibility of the Contractor during installation and until acceptance of the Work. The Contractor will be responsible for protection after the acceptance of the Work until final acceptance of all Contract Work by the Owner. All material damaged prior to acceptance by the Owner shall be replaced at no cost to the Owner.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 31 22 00 Landscape Grading
- .2 Section 33 46 00 Landscape Subdrainage

1.2 PERFORMANCE REQUIREMENTS

- .1 Engineered Wood Fiber Test results for Engineered Wood Fiber must show G-max values of less than 120G for a 12” system with a 12’ drop height, and HIC values less than 1,000.

1.3 SUBMITTALS

- .1 Manufacturers description of product, installation methods, base preparation and maintenance instructions.
- .2 MSDS sheets for materials used to construct the same.
- .3 Manufacturer’s warranty information.

Part 2 Products

2.1 ENGINEERED WOOD FIBER SAFETY SURFACE

- .1 Mulch safety surface to be FIBAR wood fibre play surfacing as manufactured by Fibar Systems, 1-800-342-2721.
- .2 Filter Fabric: non-woven 270R as manufactured by Terrafix Geosynthetics Inc. or approved equal.
- .3 Subsurface drainage: Refer to Section 33 46 00 Landscape Subdrainage

Part 3 Execution

3.1 ENGINEERED WOOD FIBRE SAFETY SURFACE

- .1 Excavation
 - .1 Excavate play areas to depth as necessary to accommodate engineered wood fiber safety surface at the required play surface.
- .2 Subgrade
 - .1 Prior to placement of Fibar, the surface is to be proof-rolled and approved by the testing company.

.3 System Installation

- .1 Install drainage tile in locations as shown on plan and as required to ensure appropriate drainage under all play areas. Outlet drains at nearest catch basin as shown on plans.
- .2 Install engineered wood fibre to depth indicated on plans as per manufacturers instructions.

3.2 CLEAN UP

- .1 Sweep any spills or clean any residue that may make contact with surrounding curbs or sidewalks.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 01 Landscape Cast In Place Concrete
- .2 Section 32 13 13 Concrete Paving and Edges

1.2 SCOPE OF WORK

- .1 Supply all labour, materials, methods and equipment to supply, fabricate and place fences, shown on drawings, specified herein, and as required for a complete and proper installation including;
 - .1 1.2m Ht. Black Vinyl Chain Link Fences

1.3 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A53/A53M-[10] , Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A90/A90M-[09] , Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
 - .3 A123 / A123M - 17 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - .4 A653/A653M-19 , Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .5 ASTM C618-[08a] , Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
 - .6 ASTM F1664-[08] , Standard Specification for Poly(Vinyl Chloride) (PVC)-Coated Steel Tension Wire Used with Chain-Link Fence.
 - .7 F934 - 96 (2017) Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-138.1-[96] , Fabric for Chain Link Fence.
 - .2 CAN/CGSB-138.2-[96] , Steel Framework for Chain Link Fence.
 - .3 CAN/CGSB-138.3-[96] , Installation of Chain Link Fence.
 - .4 CAN/CGSB-1.181-[99] , Ready-Mixed Organic Zinc-Rich Coating.
- .3 CSA Group (CSA)
 - .1 CSA A23.1/A23.2-[09] , Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A3000-[08] , Cementitious Materials Compendium.
- .4 Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for concrete mixes, fences, posts, brackets, rails, fittings, and hardware and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit shop drawings indicating;
 - .1 Show locations of fence, posts, rails, hardware, and accessories.
 - .2 Show dimensions from property lines to all end, corner and terminator posts.
 - .3 Indicate materials, dimensions, sizes, weights, and finishes of components.
 - .4 Include plans, elevations, sections, and other required installation and operational clearances, and details of post anchorage, attachment, and bracing.
 - .5 Installation recommendations and instructions by manufacturer describing all details for a typical fence.
 - .6 Reviewed and stamped installation recommendations and instructions by Professional Engineer registered in the Province of Ontario, for the installation of fences acting as Guards on retaining walls taller than 0.6m in height, as required by Ontario Building Code.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect fence materials from damage.
 - .3 Replace defective or damaged materials with new.

1.6 PROJECT CONDITIONS

- .1 Field Measurements: Verify layout information for fences shown on drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

Part 2 Products

2.1 MATERIALS – CHAIN LINK FENCE

- .1 Concrete mixes and materials: in accordance with CSA A23.1 and Section 03 30 01 – Landscape Cast-in-Place Concrete .
 - .1 Compressive strength: 20 MPa minimum at 28 days.
- .2 Chain-link fence fabric: to CAN/CGSB-138.1.
 - .1 38mm x 6ga. Mesh, zinc coated before weaving.
 - .2 Height of fabric: 1.2 m.
- .3 Posts, braces and rails: to CAN/CGSB-138.2, galvanized steel pipe.
 - .1 Dimensions;
 - .1 End and straining posts: 89.0mm O.D.
 - .2 Line posts: 60.0mm O.D.
 - .3 Rails and Braces: 43.0mm O.D.
- .4 Tension wire: to CAN/CGSB-138.2, black vinyl coated steel wire, conforming to requirements of fence fabric, 6 ga.
- .5 Tie wire fasteners: single strand, steel wire conforming to requirements of fence fabric, 6ga..
- .6 Tension bar: to ASTM A653/A653M, 5 x 20 mm minimum galvanized steel.
- .7 Fittings and hardware: to CAN/CGSB-138.2, ductile cast iron, malleable galvanized steel or cast aluminum alloy.
 - .1 Tension bar bands: 3 x 20 mm minimum galvanized steel or 5 x 20 mm minimum aluminum.
 - .2 Post caps to provide waterproof fit, to fasten securely over posts and to carry top rail.
 - .3 Turnbuckles to be drop forged.
 - .4 Hot dipped galvanized and PVC coated
- .8 Grounding rod: 16mm diameter x 3m long, copper well rod.

2.2 FINISHES

- .1 Chain Link Fences:
 - .1 Galvanizing:
 - .1 For chain link fabric: to CAN/CGSB-138.1 Grade 2.
 - .2 For pipe: 550 g/m2 minimum to ASTM A90.
 - .3 For other fittings: to CAN/CSA G164-18 .
 - .2 Black Vinyl Coating:
 - .1 All mesh fabric shall be finished with black vinyl coating, 0.64 mm dry film thickness minimum, in accordance with the latest Canadian Government specifications of vinyl coated galvanized steel.

Components shall be coated by thermal extrusion method, using an adhesive agent to bond the P.V.C. coating to the galvanized metal.

.3 Black Enamel Powder Coating:

- .1 All posts, rails, framework fasteners, fittings hardware and caps to be black gloss enamel by powder coat application. All surfaces to be chemically cleaned and treated prior to coating with parker bondrite and chlorothene solvent or equals. Powder coating must be a polyester 2000 series, thickness of 4-5mils, oven-cured to a smooth even surface.

2.3 CONCRETE

- .1 Concrete: Refer to Section 03 30 01 Landscape Cast-In-Place Concrete.

2.4 GROUT

- .1 Non-shrink, Non-metallic Grout: Premixed, factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for fence installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate.
- .2 Inform Consultant of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 PREPARATION

- .1 Grading:
- .1 Remove debris and correct ground undulations along fence line to obtain smooth uniform gradient between posts.
- .1 Provide clearance between bottom of fence and ground surface of 50mm.
- .2 Stake locations of fence lines, and terminal posts. Do not exceed intervals of 500 ft (152.5 m) or line of sight between stakes. Indicate locations of utilities, irrigation systems, underground structures, benchmarks, and property monuments.

3.3 ERECTION OF CHAIN LINK FENCE

- .1 Erect fence along lines as indicated and to CAN/CGSB-138.3.
- .2 Excavate post holes to dimensions indicated.
- .3 Space line posts as indicated, maximum 3m apart, measured parallel to ground surface.

- .4 Space straining posts at equal intervals not to exceed 150m if distance between end or corner posts on straight continuous lengths of fence over reasonably smooth grade, is greater than 150m.
- .5 Install additional straining posts at sharp changes in grade.
- .6 Install corner post where change in alignment exceeds 10 degrees.
- .7 Install end posts at end of fence and at buildings.
- .8 Place concrete in post holes then embed posts into concrete to depths indicated, minimum 450mm depth.
 - .1 Ensure concrete is not above grade level.
 - .2 Brace to hold posts in plumb position and true to alignment and elevation until concrete has set.
- .9 Install fence fabric after concrete has cured, minimum of 5 days.
- .10 Install brace between end and posts and nearest line post, placed in centre of panel and parallel to ground surface.
 - .1 Install braces on both sides of corner and straining posts in similar manner.
- .11 Install top and bottom rails between posts and fasten securely to posts and secure waterproof caps. Gap between finished grade and bottom rail shall not exceed 89.0mm for play area enclosures.
- .12 Lay out fence fabric. Stretch tightly to tension recommended by manufacturer and fasten to end, corner, and straining posts with tension bar secured to post with tension bar bands spaced at 300 mm intervals.
 - .1 Knuckled selvedge at top and bottom.
- .13 Secure fabric to top rails and bottom rails, line posts and bottom tension wire with tie wires at 450 mm intervals.
 - .1 Give tie wires minimum two twists.
- .14 Nuts and bolts for fittings shall be installed with the head on the exposed side of the fence. Bolts shall be peened over to prevent removal of the nut.
- .15 Grind and touch up all sharp ends or edges.
- .16 Provide grounding, which shall be installed by licenced electrician.

3.4 GROUNDING

- .1 Fence Grounding: Install at maximum intervals of 225m by certified electrician.

3.5 TOUCH UP

- .1 Clean and touch-up damaged surfaces in accordance with manufacturers recommendations to the satisfaction of the Consultant.
 - .1 Pre-treat damaged surfaces according to manufacturers' instructions for zinc-rich paint.

3.6 CLEANING

- .1 The area shall be left clean, neat and free of any debris resulting from the fence installation. Dispose of surplus material off site.

END OF SECTION

Part 1 General

1.1 RELATED DOCUMENTS

- .1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- .1 Section Includes:
 - .1 Decorative metallic-coated steel tubular picket fences.
 - .2 Decorative metal swing gates.
- .2 Related Sections:
 - .1 Division 03 Section Landscape Cast-in-Place Concrete for concrete bases for posts.
 - .2 Division 31 Section "Earth Moving" for site excavation, fill, and backfill where decorative metal fences and gates are located.

1.3 PERFORMANCE REQUIREMENTS

- .1 Lightning-Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

1.4 SUBMITTALS

- .1 Product Data: For each type of product indicated.
- .2 Shop Drawings: Submit shop drawings indicating;
 - .1 Show locations of fence , posts, rails, and details of hardware, and accessories.
 - .1 Show dimensions from property lines to all end, corner and terminator posts.
 - .2 Indicate materials, dimensions, sizes, weights, and finishes of components.
 - .3 Include plans, elevations, sections, and other required installation and operational clearances, and details of post anchorage, attachment, and bracing.
 - .4 Installation recommendations and instructions by manufacturer describing all details for a typical fence.
 - .5 Reviewed and Stamped installation recommendations and instructions by Professional Engineer registered in the Province of Ontario, for the installation of fences acting as Guards on retaining walls taller than 0.6m in height, as required by Ontario Building Code.
- .3 Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for decorative metallic-coated steel tubular picket fences, including finish, indicating compliance with referenced standard.

1.5 QUALITY ASSURANCE

- .1 Installer Qualifications: An experienced installer who has completed installations of fences and gates similar in material, design, and extent to those indicated for this project and whose work has resulted in construction with a record of successful in-service performance
- .2 Source Limitations for Fences and Gates: Obtain each color, grade, finish, type, and variety of components for fences and gates from one source with resources to provide fences and gates of consistent quality in appearance and physical properties.

1.6 WARRANTY

- .1 Provide manufacturer's standard warranty against defects in materials and workmanship.
 - .1 Products will be free from defects in components and workmanship for a period of five (5) years from date of manufacture.

Part 2 Products

2.1 DECORATIVE METAL FENCES

- .1 Product: Liberty, The New York Collection as supplied by Roma Fence.
www.romafence.com
- .2 Material: Galvalume coated steel
- .3 Panel Height: 1220mm
- .4 Posts: Square tubes
 - .1 Size: 2 by 2 inches (51 by 51 mm) 14 gauge.
 - .2 Post Spacing: 95-3/4 inches (2432mm) inside to inside maximum.
- .5 Post Caps: Pyramid
- .6 Rails: Rectangular tubes
 - .1 Size: 1 by 1 inches (25 by 25 mm), 14 gauge.
- .7 Pickets: Square tubes.
 - .1 Size: 5/8 inches by 5/8 inch (16 by 16mm), 18 gauge.
 - .2 Picket Spacing: 3 1/4 inches (83 mm) clear, maximum.
- .8 Fasteners: Manufacturer's standard fasteners, bolts cut back to 6mm or shrouded.
- .9 Fittings: 15 gauge stamp forged.
- .10 Finish: Chromate conversion coating and electrostatically applied, thermally bonded polyester powder coating minimum film thickness of 2.5mils
 - .1 Colour: Black.

2.2 DECORATIVE METAL GATES

- .1 Gates: Gate frames shall be decorative metal to match fence, as per manufacturer's details. Hinges must be spring loaded to ensure self closing. Latch must be self latching to ensure that the gates close and latch without assistance.

2.3 MISCELLANEOUS MATERIALS

- .1 Concrete: Refer to Section 03 30 01 Landscape Cast in Place Concrete.
- .2 Grout: Non-shrink, Non-metallic Grout: Premixed, factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

2.4 GROUNDING MATERIALS

- .1 Grounding Wire and Rods: per OPSS 609.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and other conditions affecting performance of the Work.
- .2 Do not begin installation before final grading is completed unless otherwise permitted by Consultant.
- .3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- .1 Stake locations of fence lines and terminal posts. Do not exceed intervals of 500 feet (152.5 m) or line of sight between stakes. Indicate locations of utilities, underground structures, benchmarks, and property monuments.

3.3 DECORATIVE FENCE INSTALLATION

- .1 Install fences according to manufacturer's written instructions.
- .2 Install fences by setting posts as indicated and fastening rails and infill panels to posts. Cut back, peen or shroud threads of bolts after assembly to prevent removal. Nuts and Bolts for fittings shall be installed with the head on the exterior side of the enclosure.
- .3 Lay out post locations and obtain the approval of the Landscape Architect before proceeding.
- .4 Excavate post holes for decorative fences 1400mm deep and 250mm diameter. Hand excavate around all buried utility lines. Bases shall be minimum 250mm diameter x 1275mm deep, as shown on details. Set top of footing 75mm below finished grade, slope away from posts.

- .5 Set fence posts upright in post holes, fill with concrete to within 75mm below finished grade. Allow minimum 14 days for curing. All concrete shall be ready mix minimum 32MPa at 28 days.
- .6 All metal fences shall be installed rigid, plumb, straight and true to line as shown on the drawings or directed on the site.
- .7 The Contractor shall be responsible for making good all surfaces disturbed by the installation of this work.
- .8 All bolt heads to face inside of play enclosure. All threads to be cut back to 6mm or shrouded and smooth to the touch.
- .9 Picket spacing and gaps between finished grade and bottom rails for play enclosures shall not exceed 88.9mm.

3.4 DECORATIVE FENCE GATE INSTALLATION

- .1 Install gates in locations as indicated with direction of swing as indicated.
- .2 Gates shall be plumb in the closed position having a bottom clearance of maximum 50mm. Hinge and latch offset opening space shall be no greater than 75mm in the closed position.
- .3 Swing gateposts shall be installed in accordance with ASTM F 567.
- .4 Determine position of centre gate rest for double gate.
 - .1 Cast gate rest in concrete as directed.
 - .2 Dome concrete above ground level to shed water.
- .5 Install gate stops where indicated.
- .6 All bolt heads to face inside of play enclosure. All threads to be cut back to 6mm or shrouded and smooth to the touch.
- .7 Picket spacing and gaps between finished grade and bottom rails, or gate posts and frames for play enclosures shall not exceed 88.9mm.

3.5 GROUNDING AND BONDING

- .1 Fence Grounding: Install at maximum intervals of 225m by certified electrician.

3.6 TOUCH UP

- .1 Clean and touch-up damaged surfaces in accordance with manufacturers recommendations to the satisfaction of the Consultant.

3.7 CLEANING

- .1 The area shall be left clean, neat and free of any debris resulting from the fence installation. Dispose of surplus material off site.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 32 92 23 Sodding
- .2 Section 32 93 10 Trees, Shrubs and Groundcover Planting

1.2 SCOPE

- .1 This section addresses the labour, materials, tools, services and equipment necessary for the supply and installation of Topsoil and Planting Soil.
- .2 Provide sufficient topsoil for work of this project. Amend suitable existing site topsoil for reuse or import sufficient topsoil to provide depths as specified herein, and remove any excess topsoil from site after final grading.

1.3 REFERENCE STANDARDS

- .1 Agriculture and Agri-Food Canada
 - .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 Canadian Council of Ministers of the Environment
 - .1 PN1340-[2005] , Guidelines for Compost Quality.

1.4 DEFINITIONS

- .1 Compost:
 - .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.
 - .2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.
 - .3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below (25) (50)), and contain no toxic or growth inhibiting contaminants.
 - .4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A).

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Quality control submittals:
 - .1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.
 - .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

- .3 Survey:
 - .1 On completion of finish grading, and before commencing sodding or seeding, submit a survey prepared by a registered Ontario Land Surveyor indicating grades. Grades must be verified by the Consultant prior to sodding.

Part 2 Products

2.1 TOPSOIL

- .1 Topsoil for general use: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
 - .1 Imported Topsoil:
 - .1 Soil texture based on The Canadian System of Soil Classification, to consist of 45 % sand, 35% silt and 20 % clay, and contain 5 % organic matter by weight.
 - .2 Imported topsoils or soil blends designed to serve as topsoil may not include the following:
 - .1 Soils mined from lands with an agricultural conservation easement as defined by the Ontario Ministry of Agriculture, Food and Rural Affairs.
 - .2 Soils mined from other greenfield sites, unless those soils are a by-product of a construction process.
 - .2 Native topsoil:
 - .1 To be amended as per analysis report recommendations to ensure topsoil is within typical guideline range and is suitable for intended use.
 - .3 Contain no toxic elements or growth inhibiting materials.
 - .4 Finished surface free from:
 - .1 Debris and stones over 50 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
 - .5 Consistency: friable when moist.
- .2 Topsoil for base planting soil use: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
 - .1 Imported Topsoil:
 - .1 Sandy Loam Soil texture based on The Canadian System of Soil Classification, to consist of 65 % sand, 25% silt and 10% clay, and contain 5 % organic matter by weight.
 - .2 Imported topsoils or soil blends designed to serve as topsoil may not include the following:
 - .1 Soils mined from lands with an agricultural conservation easement as defined by the Ontario Ministry of Agriculture, Food and Rural Affairs.

- .2 Soils mined from other greenfield sites, unless those soils are a by-product of a construction process.
- .2 Native topsoil:
 - .1 To be amended as per analysis report recommendations to ensure topsoil is within typical guideline range and is suitable for intended use.
- .3 Contain no toxic elements or growth inhibiting materials.
- .4 Finished surface free from:
 - .1 Debris and stones over 50 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
- .5 Consistency: friable when moist.

2.2 PLANTING SOIL

- .1 Planting Soil: pH range of 6.5 to 7.5, mixture to be 4 parts topsoil, 1 part stable compost, 1 part shredded peat moss, per cubic metre of planting soil; screened and free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.
- .2 Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
- .3 Trees Planting: Application of high phosphorus fertilizer (0-20-0)
- .4 Shrub / Perennial Planting: 1.5kg of bonemeal per cubic meter of planting soil.

2.3 SOIL AMENDMENTS

- .1 Fertilizer:
 - .1 Fertility: major soil nutrients present in following amounts:
 - .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
 - .3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
 - .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
 - .5 Calcium, magnesium, sulphur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
 - .6 Ph value: 6.5 to 7.5.
- .2 Peatmoss:
 - .1 Derived from partially decomposed species of Sphagnum Mosses.
 - .2 Elastic and homogeneous, brown in colour.
 - .3 Free of wood and deleterious material which could prohibit growth.
 - .4 Shredded particle minimum size: 5mm.
- .3 Sand: washed coarse silica sand, medium to course textured.
- .4 Organic matter: compost Category A, in accordance with CCME PN1340 , unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.

- .5 Use composts meeting Category B requirements for land fill reclamation and large scale industrial applications.
- .6 Limestone:
 - .1 Ground agricultural limestone.
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
- .7 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

2.4 SOURCE QUALITY CONTROL

- .1 Advise Consultant of sources of topsoil to be utilized with sufficient lead time for testing.
- .2 Soil testing to be completed by recognized testing facility for pH, BpH, Total Salts, Organic Matter, Phosphorus, Potassium, Magnesium, Calcium, Sodium, Chloride, sodium absorption ratio, cation exchange capacity, Texture (% Sand, % Silt, % Clay), as well as recommended amendments to ensure topsoil is suitable for intended use.
- .3 Testing of topsoil will be carried out by SGS Agrifood Laboratories (T:519-837-1242).
 - .1 Soil sampling, testing and analysis to be in accordance with Provincial standards.
 - .2 Cost for testing to be included in Contract.
- .4 Contractor is responsible for amendments to topsoil, as recommended within testing report to supply viable topsoil, at no additional cost to Owner.

Part 3 Execution

3.1 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.
 - .1 If discrepancies occur, notify Consultant and do not commence work until instructed by Consultant.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
 - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
 - .2 Remove debris which protrudes more than 75 mm above surface.
 - .3 Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
 - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.2 PLACING AND SPREADING OF TOPSOIL / PLANTING SOIL

- .1 Place topsoil after Consultant has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm.
- .3 For sodded areas keep topsoil 15 mm below finished grade.
- .4 Spread topsoil to following minimum depths after settlement.
 - .1 150 mm for general sodded areas.
- .5 Spread planting soil to following minimum depths after settlement.
 - .1 300 mm for perennial beds.
 - .2 450 mm for shrub beds.
 - .3 As per drawing details for tree plantings.
- .6 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.3 SOIL AMENDMENTS

- .1 Apply and thoroughly mix soil amendments into full specified depth of topsoil at rates recommended within soil testing reports and required planting soil mixes.

3.4 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
 - .1 Prepare loose friable bed by means of cultivation and subsequent raking.
 - .2 Leave surfaces smooth, uniform and firm against deep footprinting.

3.5 ACCEPTANCE

- .1 Consultant will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.6 SURPLUS MATERIAL

- .1 Dispose of materials except topsoil not required off site at no additional cost to Owner.

3.7 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 23 91 19 Topsoil and Finish Grading

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling:
 - .1 Schedule sod laying to coincide with preparation of soil surface.
 - .2 Schedule sod installation when frost is not present in ground.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Samples.
 - .1 Submit:
 - .1 Sod for each type specified.
 - .1 Install approved samples in 1 square metre mock-ups and maintain in accordance with maintenance requirements during establishment period.
 - .2 Bio-degradable geotextile fabric.
 - .3 [0.5] kg container of each type of fertilizer used.
 - .2 Obtain approval of samples by Consultant.
- .3 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements of seed mix, seed purity, and sod quality.
- .4 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties of seed mix, seed purity, and sod quality.

1.4 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Landscape Contractor: to be a Member in Good Standing of Landscape Ontario.
 - .2 Landscape Planting Supervisor: Landscape Industry Certified Technician with Softscape Installation designation.
 - .3 Landscape Maintenance Supervisor: Landscape Industry Certified Technician with Turf Maintenance designation.

1.5 DELIVERY, STORAGE AND HANDLING

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

- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with supplier's recommendations.
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.
 - .1 Turf Grass Nursery Sod types:
 - .1 Number One Kentucky Bluegrass Sod - Fescue Sod: Nursery Sod grown solely from seed mixture of cultivars of Kentucky Bluegrass and Chewing Fescue or Creeping Red Fescue, containing not less than 40% Kentucky Bluegrass cultivars and 30% Chewing Fescue or Creeping Red Fescue cultivars .
 - .2 Turf Grass Nursery Sod quality:
 - .1 Not more than 1 broadleaf weed and up to 1% native grasses per 40 square metres.
 - .2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.
 - .3 Mowing height limit: 35 to 65 mm.
 - .4 Soil portion of sod: 6 to 15 mm in thickness.
- .2 Sod establishment support:
 - .1 Geotextile fabric: biodegradable, 25mm square mesh
 - .2 Wooden pegs: 17 x 8 x 200 mm.
 - .3 Biodegradable starch pegs: 17 x 8 x 200 mm.
- .3 Water:
 - .1 Potable.
- .4 Fertilizer:
 - .1 To Canada "Fertilizers Act" and Fertilizers Regulations.
 - .2 Complete, synthetic, slow release with 65 % of nitrogen content in water-insoluble form.

Part 3 Execution

3.1 INSTALLERS

- .1 Use installers who are Member in Good Standing of Landscape Ontario.

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sod installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.3 PREPARATION

- .1 Verify that grades are correct and prepared in accordance with Section 32 91 19 - Topsoil and Finish Grading. If discrepancies occur, notify Consultant and commence work when instructed by Consultant.
- .2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.
- .3 Fine grade surface free of humps and hollows to smooth, even grade, to tolerance of plus or minus 15mm, surface to drain naturally.
- .4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site.

3.4 SOD PLACEMENT

- .1 Ensure sod placement is done under supervision of certified Landscape Planting Supervisor.
- .2 Lay sod within 24 hours of being lifted if air temperature exceeds 20 degrees C.
- .3 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .4 Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.5 SOD PLACEMENT ON SLOPES AND PEGGING

- .1 Install and secure geotextile fabric in areas indicated, in accordance with manufacturer's instructions.
- .2 Start laying sod at bottom of slopes.
- .3 Peg sod on slopes steeper than 3 horizontal to 1 vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to following pattern:
 - .1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.

- .2 Not less than 3 pegs per square metre.
- .3 Not less than 6 pegs per square metre in drainage structures. Adjust pattern as directed by Consultant.
- .4 Drive pegs to 20 mm above soil surface of sod sections.

3.6 CLEANING

- .1 Leave Work area clean at end of each day.
- .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.

3.7 PROTECTION BARRIERS

- .1 Protect newly sodded areas from deterioration and foot traffic with temporary chain link fencing as directed by Consultant.
- .2 Remove protection 8 weeks after installation as directed by Consultant.

3.8 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of installation until acceptance.
 - .1 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 100 mm.
 - .2 Cut grass to 50 mm when or prior to it reaching height of 75 mm.
 - .3 Maintain sodded areas weed free, 95%.
 - .4 Fertilize areas in accordance with manufacturer recommended fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
 - .5 Temporary barriers or signage to be maintained where required to protect newly established sod.

3.9 ACCEPTANCE

- .1 Sodded areas will be accepted by Consultant provided that:
 - .1 Sodded areas are properly established.
 - .2 Sod is free of bare and dead spots.
 - .3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.
 - .4 Sodded areas have been cut minimum 2 times prior to acceptance.
- .2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.
- .3 When environmental conditions allow, all sodded areas showing shrinkage cracks shall be top-dressed and seeded with a seed mix matching the original.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 32 91 19 Topsoil and Finish Grading

1.2 REFERENCE STANDARDS

- .1 Agriculture and Agri-Food Canada (AAFC).
 - .1 Plant Hardiness Zones in Canada-[2000] .
- .2 Canadian Nursery Landscape Association (CNLA)
 - .1 Canadian Standards for Nursery Stock-[2006] .

1.3 DEFINITIONS

- .1 Mycorrhiza: association between fungus and roots of plants. This symbiosis, enhances plant establishment in newly landscaped and imported soils.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling: obtain approval from Consultant of schedule 7 days in advance of shipment of plant material.
- .2 Schedule to include:
 - .1 Quantity and type of plant material.
 - .2 Shipping dates.
 - .3 Arrival dates on site.
 - .4 Planting Dates.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for [trees, shrubs, ground cover, fertilizer, mycorrhiza, anti-desiccant, anchoring equipment, and mulch] and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Samples:
 - .1 Submit samples of mulch.

1.6 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Landscape Contractor: to be a Member in Good Standing of Landscape Ontario.
 - .2 Landscape Planting Supervisor: Landscape Industry Certified Technician with Softscape Installation designation.

- .3 Landscape Maintenance Supervisor: Landscape Industry Certified Technician with Ornamental Maintenance designation.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .1 Protect plant material from frost, excessive heat, wind and sun during delivery.
 - .2 Protect plant material from damage during transportation:
 - .1 Delivery distance is less than 30 km and vehicle travels at speeds under 80 km/h, tie tarpaulins around plants or over vehicle box.
 - .2 Delivery distance exceeds 30 km or vehicle travels at speeds over 80 km/h, use enclosed vehicle where practical.
 - .3 Protect foliage and root balls using anti-desiccants and tarpaulins, where use of enclosed vehicle is impractical due to size and weight of plant material.
- .2 Storage and Handling Requirements:
 - .1 Immediately store and protect plant material which will not be installed within on working day in accordance with supplier's written recommendations and after arrival at site.
 - .2 Protect stored plant material from frost, wind and sun and as follows:
 - .1 For pots and containers, maintain moisture level in containers.
 - .2 For balled and burlapped and wire basket root balls, place to protect branches from damage. Maintain moisture level in root zones.
 - .3 Store and manage hazardous materials in accordance with manufacturer's written instructions.

1.8 WARRANTY

- .1 Plant material as itemized on plant list to include the 12 months warranty period from time of acceptance. Plant material that is planted after leaf drop will be reviewed for acceptance the following spring, after leaf-out.
- .2 Contractor hereby warrants that plant material as itemized on plant list will remain free of defects, in healthy and vigorous growing condition, for 1 full growing season, providing adequate maintenance has been provided.
- .3 End-of-warranty inspection will be conducted by Consultant.
- .4 Consultant reserves the right to extend Contractor's warranty responsibilities for an additional one year if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.

Part 2 Products

2.1 PLANT MATERIAL

- .1 Type of root preparation, sizing, grading and quality: comply to Canadian Standards for Nursery Stock.
 - .1 Source of plant material: grown in Zone 5
 - .2 Plant material must be planted in zone specified as appropriate for its species.
 - .3 Plant material in location appropriate for its species.
- .2 Plant material: free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.
- .3 Trees: with straight trunks, well and characteristically branched for species.
- .4 Bare root stock: nursery grown, in dormant stage, not balled and burlapped or container grown.

2.2 WATER

- .1 Potable and free of impurities that would inhibit plant growth.

2.3 STAKES

- .1 Wood, pointed one end, 50 x 50 x 2400 mm.

2.4 WIRE TIGHTENER

- .1 Turnbuckle, galvanized steel

2.5 GUYING WIRE

- .1 Type 1: #10 galvanized steel wire
- .2 Type 2: Green Arbortie or equivalent, secured to stake with 1" galvanized roofing nails.

2.6 ANCHORS

- .1 Wood:
 - .1 Type 2: 50 x 50 x 750mm.

2.7 GUYING COLLAR

- .1 Tube: plastic, 13 mm diameter, green rubber hose

2.8 TRUNK PROTECTION

- .1 Plastic: perforated spiralled strip.

2.9 MULCH

- .1 Shredded wood: varying in size from 25 to 125 mm in length, from coniferous trees.

2.10 FERTILIZER

- .1 Refer to Section 32 91 19 Topsoil and Finish Grading.

2.11 ANTI-DESICCANT

- .1 Wax-like emulsion to provide film over plant surfaces reducing evaporation but permeable enough to permit transpiration.

2.12 FLAGGING TAPE

- .1 Fluorescent, orange

2.13 SOURCE QUALITY CONTROL

- .1 Obtain approval from Consultant of plant material prior to planting.

2.14 ADDITIONAL PLANT MATERIAL QUALIFICATIONS

- .1 Plant material obtained from areas with milder climatic conditions from those of site acceptable only when moved to site prior to the breaking of buds in their original location and heeled-in, in a protected area until conditions suitable for planting.
- .2 Use trees and shrubs must have been root pruned regularly, but not later than one growing season prior to arrival on site.
- .3 Cold storage: written request and approval required for plant material which has been held in cold storage.
- .4 Container-grown stock: acceptable if containers large enough for root development. Shrubs must have grown in container for minimum of one growing season but not longer than two. Root system must be able to "hold" soil when removed from container. Plants that have become root bound are not acceptable. Container stock must have been fertilized with slow releasing fertilizer.
- .5 Balled and burlapped: coniferous and broad-leaved evergreens over 500mm. tall must be dug with soil ball. Deciduous trees in excess of 3m height must have been dug with large ball. Root balls must include 75% of fibrous and feeder root system. This excludes use of native trees grown in light sandy or rocky soil. Secure root balls with burlap and heavy twine, rope or a wire basket.
- .6 Collected plant material: will not be permitted.
- .7 Substitutions to plant material as indicated on planting plan not permitted unless written approval has been obtained as to type, variety and size. Plant substitutions must be of similar species and of equal size as those originally specified.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for planting installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate.
- .2 Inform Consultant of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 PRE-PLANTING PREPARATION

- .1 Proceed only after receipt of written acceptability of plant material from Consultant.
- .2 Remove damaged roots and branches from plant material.
- .3 Apply anti-desiccant to conifers and deciduous trees in leaf in accordance with manufacturer's instructions.
- .4 Locate and protect utility lines.
- .5 Notify and acquire written acknowledgement from utility authorities before beginning excavation of planting pits for trees and shrubs.

3.3 EXCAVATION AND PREPARATION OF PLANTING BEDS

- .1 Preparation of planting beds in accordance with Section 32 91 19 - Topsoil and Finish Grading.
- .2 For individual planting holes:
 - .1 Stake out location and obtain approval from Consultant prior to excavating.
 - .2 Excavate to depth and width as indicated. All pits and beds shall be shaped and prepared as to allow for free drainage from the excavation.
 - .3 Scarify subgrade surfaces sides of planting hole to a depth of 75mm in areas where planting soil will be placed to produce an even, loose textured surface, free from line weeds, stones, roots, branches and similar materials larger than 50mm.
 - .4 Dispose of surplus excavated materials off-site.
 - .5 Remove water which enters excavations prior to planting. Notify Consultant if water source is ground water.
 - .6 Prevent freezing of bottom of plant pits.
 - .7 Excavate plant pits to receive frozen root balls while soil is unfrozen, and mulch with straw to protect from freezing until trees are planted.

3.4 PLANTING

- .1 Planting shall be done during periods suitable with respect to weather conditions and locally accepted practice.
- .2 Handle plants carefully, supporting entire plant while moving.
- .3 For bare root stock, place 75 mm backfill soil in bottom of hole.
 - .1 Plant trees and shrubs with roots placed straight out in hole.
- .4 For jute burlapped root balls, cut away top one third of wrapping and wire basket without damaging root ball.
 - .1 Do not pull burlap or rope from under root ball.

- .5 For container stock or root balls in non-degradable wrapping, remove entire container or wrapping without damaging root ball.
- .6 Plant vertically in locations as indicated.
 - .1 Orient plant material to give best appearance in relation to structure, roads and walks and to the approval of Consultant.
 - .2 Tag specimen trees (over 75mm caliper) in the nursery and install with same north-south orientation on site
- .7 For trees and shrubs:
 - .1 Backfill soil in 150 mm lifts.
 - .1 Tamp each lift to eliminate air pockets.
 - .2 When two thirds of depth of planting pit has been backfilled, fill remaining space with water.
 - .3 After water has penetrated into soil, backfill to finish grade.
 - .2 Form earth watering saucer at the base of each plant with a diameter as large as the excavated area.
- .8 For ground covers, backfill soil evenly to finish grade and tamp to eliminate air pockets.
- .9 Water plant material thoroughly.
- .10 After soil settlement has occurred, fill with soil to finish grade.
- .11 After plant installation, remove all labels attached by wire or cord.

3.5 TRUNK PROTECTION

- .1 Install trunk protection on deciduous trees as indicated.
 - .1 Wrap the main stem of each tree having caliper of 50mm or greater.
 - .2 Apply wrapping in a spiral manner with one-half overlap, each time starting at grade and extending upwards to just above the second branches.
 - .3 Make sure all wrapping is neat and snug and held in place by suitable cord. All areas of contact with support systems shall be double wrapped.
- .1 Install trunk protection before installation of tree supports.

3.6 TREE SUPPORTS

- .1 Stake or guy all plants as shown on drawings for individual materials with all supports, guys and fasteners snug and secure
- .2 Space stake equally around plant and drive into undisturbed soil beneath roots, 150 mm minimum. Ensure stake is secure, vertical and unsplit.
- .3 Ensure stakes are placed on prevailing wind side.
- .4 Install guying collars above branch to prevent slipping at approximately 2/3 height for evergreens and 1/2 height for deciduous trees. Collar mounting height not to exceed 2.5 m above grade.

- .5 Guying collars to be of sufficient length to encircle tree plus 50 mm space for trunk clearance. Thread guy wire through collar encircling tree trunk and secure to lead wire by clamp or multi-wraps; cut wire ends close to wrap.
- .6 Saw tops off wooden anchors which extend in excess of 150 mm above grade or as directed by Consultant.
- .7 Install flagging tape to guys as indicated.

3.7 PRUNING

- .1 After tree supports have been installed, remove broken branches with clean, sharp tools. Do not prune plants except to remove dead or injured branches.
- .2 Prune in such a manner as to preserve the natural character of the plants. Do not remove leaders.

3.8 MULCHING

- .1 Ensure soil settlement has been corrected prior to mulching.
- .2 Spread mulch as indicated.

3.9 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following maintenance operations from time of planting to acceptance by Consultant.
 - .1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.
 - .2 For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.
 - .3 Remove weeds monthly.
 - .4 Replace or respread damaged, missing or disturbed mulch.
 - .5 For non-mulched areas, cultivate as required to keep top layer of soil friable.
 - .6 If required to control insects, fungus and disease, use appropriate control methods in accordance with Municipal regulations. Obtain product approval from Consultant prior to application.
 - .7 Remove dead or broken branches from plant material.
 - .8 Keep trunk protection and guy wires in proper repair and adjustment.
 - .9 Remove and replace dead plants and plants not in healthy and vigorous growing condition. Make replacements in same manner as specified for original plantings.

3.10 MAINTENANCE DURING WARRANTY PERIOD

- .1 From time of acceptance by Consultant to end of warranty period, perform following maintenance operations.
 - .1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.
 - .2 Reform damaged watering saucers.
 - .3 Remove weeds monthly.

- .4 Replace or respread damaged, missing or disturbed mulch.
- .5 For non-mulched areas, cultivate monthly to keep top layer of soil friable.
- .6 If required to control insects, fungus and disease, use appropriate control methods in accordance with Municipal regulations. Obtain product approval from Consultant prior to application.
- .7 Apply fertilizer in early spring as indicated by soil test.
- .8 Remove dead, broken or hazardous branches from plant material.
- .9 Keep trunk protection and tree supports in proper repair and adjustment.
- .10 Remove trunk protection, tree supports and level watering saucers at end of warranty period.
- .11 Remove and replace dead plants and plants not in healthy and vigorous growing condition. Make replacements in same manner as specified for original plantings.
- .12 Submit monthly written reports to Consultant identifying:
 - .1 Maintenance work carried out.
 - .2 Development and condition of plant material.
 - .3 Preventative or corrective measures required which are outside Contractor's responsibility.
- .2 Provide written warranty for 1 year from date of acceptance. Replace any exterior plants which in the opinion of the Consultant, are not in acceptable condition at the end of the warranty period.
- .3 Any damage to plant materials from any source whatsoever shall be reported in writing to the Consultant and Owner.

3.11 CLEANING

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.12 CLOSEOUT ACTIVITIES

- .1 Submit maintenance reports for trees, shrubs, and other plantings.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 The scope of work includes all labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for, and incidental to performing all operations in connection with furnishing, delivery, and installation of landscape edging materials (also known as "edging") complete as shown on the drawings and as specified herein.
- .2 The scope of work in this section includes, but is not limited to, the following;
 - .1 Precast Maintenance Edge

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C136-[13] , Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .2 ASTM C140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
 - .3 ASTM C936, Standard Specification for Solid Concrete Interlocking Paving Units.
 - .4 ASTM C979/C979M-[10] , Standard Specification for Pigments for Integrally Colored Concrete.
 - .5 ASTM C1645 Standard Test Method for Freeze-thaw and De-icing Salt Durability of Solid Concrete Interlocking Paving Units
- .2 CSA Group
 - .1 CSA A23.1/A23.2-[09] , Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A179-[04(R2009)] , Mortar and Grout for Unit Masonry.
 - .3 CSA A231.1/A231.2-[06(R2010)] , Precast Concrete Paving Slabs/Precast Concrete Pavers.
 - .4 CSA A283-[06(R2011)] , Qualification Code for Concrete Testing Laboratories.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for precast concrete units and include product characteristics, performance criteria, physical size, finish and limitations.

- .3 Samples:
 - .1 Submit full size samples of each paver type, thickness, colour and finish that indicate the range of colour variation and texture expected upon project completion if requested by consultant for approval.
 - .2 Accepted samples become the standard of acceptance for the product produced.
- .4 Test and Evaluation Reports:
 - .1 Submit following sampling and testing data:
 - .1 Sieve analysis for gradation of bedding and joint material.
 - .2 Precast Unit sampling and testing.
 - .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company or person specializing in precast concrete paver installations of similar complexity, size and material with 5 documented years of experience.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect materials free from mud, dirt, and other foreign materials.
 - .3 Store and protect precast concrete units from nicks, scratches, and blemishes.
 - .4 Replace defective or damaged materials with new.

PART 2 MATERIALS

2.1 CONCRETE UNITS

- .1 Concrete pavers to be manufactured by Techo-Bloc or approved equivalent.
- .2 Concrete Paver Type 1: Industria Granitex Commercial
 - .1 Size: 300x600x100mm
 - .2 Colour: Shale Grey
 - .3 Finish: HD2 Granitex

- .3 Pavers shall meet the minimum material and physical properties set forth in ASTM C936.
 - .1 Average compressive strength 8000psi (55 MPa) with no individual unit under 7,200 psi (50 MPa)
 - .2 Average absorption of 5% with no greater than 7% when tested according to ASTM C140.
 - .3 Conforming to ASTM C 1645 when tested for freeze-thaw requirements.
 - .4 Height tolerances +/- 3.2mm.
- .4 Pigment in concrete pavers: to ASTM C979/C979M.
- .5 Maximum allowable breakage of product is 5%.

2.2 BASE AGGREGATE

- .1 Unit Paving Base Aggregate
 - .1 19mm clear stone to OPSS 1010.

2.3 DRAINAGE BOARD

- .1 Miradrain 2000S or equivalent.

2.4 SUBDRAINAGE

- .1 Refer to Section 33 46 00 Landscape Subdrainage.

2.5 CLEANING COMPOUND

- .1 Clear, organic solvent, designed and recommended by manufacturer for cleaning concrete units of contamination encountered.
- .2 Acid based chemical detergent, designed and recommended by manufacturer for removal of contamination encountered on concrete units.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for precast concrete unit installation in accordance with manufacturer's written instructions and requirements for installation tolerances and other conditions affecting performance prior to placing concrete units.
 - .1 Precast Concrete Units on Aggregate Base:
 - .1 Verify that the Base aggregate materials, thickness, compacted density, surface tolerances and elevations conform to specified requirements.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.
 - .1 Beginning Paver installation signifies acceptance of base and edge restraint conditions.

3.2 BASE AGGREGATES

- .1 Unit Base:
 - .1 Provide the Base Aggregate material in uniform lifts not exceeding 6 in. (150 mm) over the compacted Subgrade material and compact to at least 98 percent Standard Proctor Density as per ASTM D 698.
 - .2 Compact the Base Aggregate material with at least two passes in the vibratory mode then at least two in the static mode with a minimum 10 ton vibratory roller until there is no visible movement. Do not crush aggregate with the roller.
 - .3 Tolerance: Do not exceed the specified surface grade of the compacted Base Aggregate material more than $\pm 3/8$ in. (10 mm) over a 10 ft. (3 m) long straightedge laid in any direction.

3.3 INSTALLATION OF CONCRETE UNITS

- .1 Replace Concrete Units with chips, cracks, voids, discolorations, and other defects that might be visible in finished work.
- .2 Adjust laying pattern at pavement edges such that cutting of edge pavers is minimized. All cut units shall be no smaller than one-third of a whole unit.
- .3 Use string lines or chalk lines to hold all pattern lines true.
- .4 Set surface elevation of pavers $1/8$ in. (3 mm) above adjacent drainage inlets, concrete collars or channels.
- .5 Provide space between paver units of $1/32$ in. (1 mm) wide to achieve straight bond lines.
- .6 Cut units with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

3.4 FIELD QUALITY CONTROL

- .1 Verify final elevations for conformance to the drawings after sweeping the surface clean.
 - .1 Prevent final Concrete Unit finished grade elevations from deviating more than $\pm 3/8$ in. (± 10 mm) under a 10 ft (3 m) straightedge or indicated slope, for finished surface of paving.
- .2 Paver-to-Paver Lippage:
 - .1 No greater than 3 mm ($1/8$ inch) difference in height between adjacent pavers.

3.5 REPAIRING, CLEANING AND SEALING

- .1 Remove and replace units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.
- .2 Cleaning: Remove excess dirt, debris, stains, grit, etc. from exposed paver surfaces; wash and scrub clean.

- .1 Clean Concrete Pavers in accordance with the manufacturer's written recommendations.

3.6 PROTECTION

- .1 Protect completed work from damage due to subsequent construction activity on the site.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 Read and be governed by conditions of the Contract and sections of Division 1.

1.2 Site Conditions

- .1 Underground utility lines or other buried objects not shown on landscape plan are the responsibility of the Contractor and must be established in location and depth before commencing work.

1.3 Protection

- .1 Prevent damage to trees, landscaping, natural features, bench marks, surface or underground utility lines, which are to remain. Make good any damage.

Part 2 Products

2.1 MATERIALS

- .1 Outdoor Classroom Limestone Boulder Seating:
 - .1 Material: Wiarton limestone, as supplied by Beaver Valley Stone, T: (416) 222-2424, or approved equal.
 - .2 Size: 1000(L)x600(W)x600mm ht.
 - .3 Finish: natural top and bottom, split face sides. Abutting faces to be sawcut to ensure maximum gap between boulders is 10mm or less. Sharp edges to be ground smooth to the touch.
 - .4 Quantity: in sufficient number to complete layout as shown on plan.
- .2 Bedding and backfill material:
 - .1 Granular 'A', conforming to OPSS.
- .3 Filter Fabric:
 - .1 'Terrafix 270R' by Terrafix Geosynthetics Inc. or approved equal, (416) 674-0363.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine surfaces and conditions upon which work of this Section depends.
- .2 Commencement of work will denote acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Verify dimensions and grades on site and make minor adjustments to suit site conditions and to Landscape Architect's approval. Report any discrepancies to Consultant prior to placing stone.
- .2 Remove any unconsolidated soils or deleterious material from bedding area.
- .3 Face bedding course as specified to the satisfaction of Consultant prior to placing any stone.

3.3 INSTALLATION

- .1 The subgrade shall be graded smooth and compacted to 98% Standard Proctor Maximum Dry Density.
- .2 All pieces shall be bedded as shown on the drawings.
- .3 All boulders shall tightly abut together, maximum gap between boulders shall be 10mm.
- .4 Grind all sharp corners and edges smooth.

3.4 COMPLETION

- .1 Upon completion of the work in this section, remove surplus materials, tools, equipment and debris, and leave site in a clean and tidy condition to the complete satisfaction of the Owner.

END OF SECTION

1. **GENERAL**

1.1. **General Requirements**

1. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda for all work, including work outside the property line including work within Regional and Municipal right of way unless otherwise noted.

1.2. **Related Work**

- | | | |
|----|---------------------------------------|------------------|
| 1. | Site Grading | Section 31 23 13 |
| 2. | Excavating, Trenching and Backfilling | Section 31 23 10 |
| 3. | Storm Sewers | Section 33 44 00 |
| 4. | Aggregates: General | Section 31 05 17 |

1.3. **References**

1. ASTM A48/A48M-03 (2016), Specification for Gray Iron Castings.
2. ASTM C139-18 (1989), Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
3. ASTM C478M-90, Specification for Precast Reinforced Concrete Manhole Sections
4. CSA A3000, Portland Cement.
5. CSA A3000, Masonry Cement.
6. CAN/CSA-A23.1-M90, Concrete Materials and Methods for Concrete Construction.
7. CSA A82.56-M1976, Aggregate for Masonry Mortar.
8. CAN3-A165 Series-M85, CSA Standards on Concrete Masonry Units.
9. CAN/CSA-G30.18-M92, Billet Steel Bars for Concrete Reinforcement.
10. CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
11. Ontario Provincial Standard Specification 407.

2. **PRODUCTS**

2.1. **Materials**

1. Precast manhole units: to ASTM C478M, circular or oval. Top sections eccentric cone or flat slab top type with opening offset for vertical ladder installation. Monolithic bases to be approved by Consultant and set on concrete slabs cast in place.
 1. 1200 mm diameter manhole as per OPSD 701.010.
2. Precast catch basins: to ASTM C478M.
 1. Catch basins as per OPSD 705.010
3. Joints: to be made watertight using rubber rings or cement mortar.
4. Mortar:
 1. Aggregate: to CSA A82.56.
 2. Cement: to CAN/CSA-A8.

5. Ladder rungs: to CAN/CSA-G30.18, No. 25M billet steel deformed bars, hot dipped galvanized to CAN/CSA G164 Rungs to be safety pattern (drop step type).
6. Adjusting rings: to ASTM C478M.
7. Concrete Brick: to CAN3-A165 Series.
8. Frames, gratings, covers to dimensions as indicated and following requirements:
 1. Metal gratings and covers to bear evenly on frames. A frame with grating or cover to constitute one unit. Assemble and mark unit components before shipment.
 2. Gray iron castings: to ASTM A48, strength class 30B.
 3. Castings: coated with two applications of asphalt varnish.
 4. Storm manhole frames and covers: heavy duty municipal type for road service. Cover cast without perforations and complete with two 25 mm square lifting holes, as per OPSD 400.010, unless otherwise specified.
 5. Catchbasin frame and cover: as per OPSD 400.010.
 6. Manhole frame and cover as per OPSD 401.010 Type A.
9. Granular bedding and backfill: Granular B Type I: to OPSD 1010 and Section 02701 – Aggregates: General and to Section 02315 – Excavating, Trenching and Backfilling.
10. Unshrinkable fill: to Section 02315 – Excavating, Trenching and Backfilling.

3. **EXECUTION**

3.1. **Excavation and Backfill**

1. Excavate and backfill in accordance with Section 31 23 10 – Excavating, Trenching and Backfilling.
2. Obtain approval of Consultant before installing manholes or catch basins.

3.2. **Installation**

1. Construct units in accordance with details indicated, plumb and true to alignment and grade.
2. Complete units as pipe laying progresses. Maximum of three units behind point of pipe laying will be allowed.
3. Dewater excavation free of standing water or as directed by Consultant and remove soft and foreign material before placing concrete base.
4. Set precast concrete base on 150 mm minimum of granular bedding compacted to 100% Corrected Maximum Dry Density.
5. Precast units.
 1. Set bottom section of precast unit in bed of cement mortar and bond to concrete slab or base. Make each successive joint watertight with rubber ring gaskets, cement mortar, or combination thereof.
 2. Clean surplus mortar and joint compounds from interior surface of unit as work progresses.
 3. Plug lifting holes with precast concrete plugs set in cement mortar or mastic compound.

6. For sewers:
 1. Place stub outlets and bulkheads at elevations and in positions indicated.
 2. Bench to provide a smooth U-shaped channel in manholes.
 7. Compact granular backfill to 98% Corrected Maximum Dry Density.
 8. Place frame and cover on top section to elevation as indicated. If adjustment required use concrete ring.
 9. Clean units of debris and foreign materials. Remove fins and sharp projections. Prevent debris from entering system.
- 3.3. **Leakage Test**
1. Visual inspection of leakage will be carried out. If any leakage is observed, correct leakage as directed by Consultant at no additional cost.

END OF SECTION

1. **GENERAL**

1.1. **General Requirements**

1. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda for all work, including work outside the property line including work within Regional and Municipal right of way unless otherwise noted.

1.2. **Description**

1. The work included in this Section includes for all labour, equipment and materials required for the watermain construction within the site, and watermain construction within the municipal right of way connecting to existing municipal servicing.
2. Included in the work is coordination and cooperation with Municipal forces as required to complete the work including providing temporary blow offs, isolation valves, pressure testing and chlorination as required by Municipal forces.

1.3. **Related Work**

1. Excavating, Trenching and Backfilling Section 31 23 10

1.4. **References**

1. The Municipality Standards and Specifications for watermain construction.

1.5. **Scheduling Of Work**

1. Schedule work to minimize interruptions to existing services.

2. **PRODUCTS**

1. All products utilized within the water system to comply with the Municipality Standards and Specifications.

3. **EXECUTION**

3.1. **Preparation**

1. Clean pipes, fittings, and appurtenances of accumulated debris and water before installation. Carefully inspect materials for defects to approval of Consultant. Remove defective materials from site as directed by Consultant.

3.2. **Trenching**

1. Do trenching work in accordance with Section 31 23 10 – Excavating, Trenching and Backfilling.
2. Trench depth to provide cover over pipe of not less than 1.75 metres from finished grade or as indicated.
3. Trench alignment and depth require Consultants' approval prior to placing bedding material and pipe.

3.3. **Granular Bedding**

1. Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness to depth of 300 mm below bottom of pipe or to depth as indicated.
2. Do not place material in frozen condition.
3. Shape bed true to grade to provide continuous uniform bearing surface for pipe.
4. Shape transverse depressions in bedding as required to suit joints.
5. Compact each layer full width of bed to at least 95% of corrected maximum dry density.
6. Fill authorized or unauthorized excavation below design elevation of bottom of specified bedding in accordance with Section 31 23 10 – Excavating, Trenching and Backfilling with compacted bedding material.

3.4. **Pipe Installation**

1. Lay pipes to ANSI/AWWA C600 Manual of Practice and manufacturer's standard instructions and specifications. Do not use blocks except as permitted in 3.3.2.
2. Join pipes in accordance with ANSI/AWWA C600, ANSI/AWWA C206, AWWA Manual of Practice and manufacturer's recommendations.
3. Bevel or taper ends of PVC pipe to match fittings.
4. Handle pipe by methods approved by Engineer recommended by pipe manufacturer. Do not use chains or cables passed through pipe bore so that weight of pipe bears on pipe ends.
5. Lay pipes on prepared bed, true to line and grade. Ensure barrel of each pipe is in contact with shaped bed throughout its full length. Take up and replace defective pipe. Correct pipe which is not in true alignment or grade or pipe which shows differential settlement after installation greater than 10 mm in 3 m.
6. Face socket ends of pipe in direction of laying. For mains on a grade of 2% or greater, face socket ends upgrade.
7. Do not exceed permissible deflection at joints as recommended by pipe manufacturer.
8. Keep jointing materials and installed pipe free of dirt and water and other foreign materials. Whenever work is stopped, install a removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
9. Position and join pipes with equipment and methods approved by Consultant.
10. Cut pipes in an approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
11. Align pipes carefully before jointing.
12. Install gaskets to manufacturer's recommendations. Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
13. Avoid displacing gasket or contaminating with dirt or other foreign material. Gaskets so disturbed or contaminated shall be removed, cleaned, lubricated and replaced before jointing is attempted again.
14. Complete each joint before laying next length of pipe.
15. Minimize deflection after joint has been made.
16. Apply sufficient pressure in making joints to ensure that joint is completed to manufacturer's recommendations.

17. Ensure completed joints are restrained by compacting bedding material alongside and over installed pipes or as otherwise approved by the Consultant.
18. Provide necessary fittings and adaptors as required between existing watermain pipe materials and proposed watermain pipe materials.
19. When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.
20. Recheck plastic pipe joints assembled above ground after placing in trench to ensure that no movement of joint has taken place.
21. Do not lay pipe on frozen bedding.
22. Contractor responsible for satisfactory completion of hydrostatic and leakage testing to Consultant's approval. Contractor also responsible for degree of backfilling complete prior to hydrostatic and leakage testing as well as isolation and correction of any leaks resulting in failed tests.
23. Backfill remainder of trench.

3.5. **Cathodic Protection And Tracer Wire**

1. Install as per Municipal Standards,

3.6. **Hydrostatic And Leakage**

1. Provide labour, equipment and materials required to perform hydrostatic and leakage tests hereinafter described as required by the Municipality standards.
2. Notify Consultant at least 24 h in advance of all proposed tests. Perform tests in presence of Consultant.
3. Where any section of system is provided with concrete thrust blocks, conduct tests at least 5 days after placing concrete or 2 days if high early strength concrete is used.
4. Test pipeline in sections not exceeding 365 m in length, unless otherwise authorized by Consultant.
5. Upon completion of pipe laying and after Consultant has inspected work in place, surround and cover pipes between joints with approved granular material placed to dimensions indicated or directed by Consultant.
6. Leave hydrants, valves, backflow preventer, water meter, joints and fittings exposed.
7. When testing is done during freezing weather, protect hydrants, valves, backflow preventer, water meter, joints and fittings from freezing.
8. Strut and brace caps, bends, tees, and valves, to prevent movement when test pressure is applied.
9. Open valves.
10. Expel air from main by slowly filling main with potable water. Install corporation stops at high points in main where no air-vacuum release valves are installed. Remove stops after satisfactory completion of test and seal holes with plugs.
11. Thoroughly examine exposed parts and correct for leakage as necessary.
12. Examine exposed pipe, joints, fittings and appurtenances while system is under pressure.
13. Remove joints, fittings and appurtenances found defective and replace with new sound material and make watertight.
14. Repeat hydrostatic test until all defects have been corrected.
15. Apply a leakage test pressure of equal to design pressure after complete backfilling of

trench, based on elevation of lowest point in main and corrected to elevation of gauge, for period of 2 h.

16. Define leakage as amount of water supplied from water meter in order to maintain test pressure for 2 h.
17. Do not exceed allowable leakage of 0.03 L/mm diameter per 300 m of pipe, including lateral connections, per hour.
18. Locate and repair defects if leakage is greater than amount specified.
19. Repeat test until leakage is within specified allowance for full length of water main.

Pipe Surround

20. Upon completion of pipe laying and after Consultant has inspected work in place, surround and cover pipes as indicated.
21. Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated. Do not dump material within 5 m of pipe.
22. Place layers uniformly and simultaneously on each side of pipe.
23. Do not place material in frozen condition.
24. Compact each layer from pipe invert to mid height of pipe to at least 95% of SPMDD to ASTM D698.
25. Compact each layer from (mid height) of pipe to underside of backfill to at least 95% of SPMDD and in accordance with Geotechnical Report for site.

3.7. Backfill

1. Place backfill material above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
2. Do not place backfill in frozen condition.
3. Compact native backfill to at least 95% of SPMDD.

3.8. Flushing And Disinfecting

1. The Municipality shall perform all chlorination works.
2. Flush water mains through available outlets with a sufficient flow of potable water to produce a velocity of 1.5 m/s, within pipe for 10 min., or until foreign materials have been removed and flushed water is clear.
3. Flushing flows shall be as follows:

<u>Pipe Size NPS</u>	<u>Flow (L/s) Minimum</u>
6 and below	38
8	75

4. Provide connections and pumps for flushing as required.
5. Open and close valves, hydrants and service connections to ensure thorough flushing.
6. Complete flushing to satisfaction of Consultant and The Municipal forces.

END OF SECTION

1. **GENERAL**

1.1. **General Requirements**

1. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda for all work, including work outside the property line including work within Regional and Municipal right of way unless otherwise noted.

1.2. **Related Work**

1. Site Grading Section 31 23 13
2. Excavating, Trenching and Backfilling Section 31 23 10
3. Manholes and Catchbasins Section 33 05 14
4. Aggregates: General Section 31 05 17

1.3. **References**

1. ASTM D3034, Specification for Type PSM Poly Vinyl Chloride (PVC) Sewer Pipe and fittings.
2. CAN/CSA-B182.2, PVC Sewer Pipe and Fittings (PSM Type),
3. CAN/CSA-B182.11, Recommended Practice for the Installation of Plastic Crain and Sewer Pipe and Pipe Fittings.
4. Ontario Provincial Standard Specification 410.

1.4. **Material Certification**

1. Submit manufacturer's test data and certification at least 2 weeks prior to commencing work.
2. Certification to be marked on pipe.

1.5. **Scheduling of Work**

1. Schedule work to minimize interruptions to existing services and to maintain existing flow during construction.

2. **PRODUCTS**

2.1. **PVC Pipe**

Poly Vinyl Chloride pipe as specified in the Contract Drawings shall be in accordance with OPSS 410, Pipe Sewer Installation in Open Cut.

2.2. **Pipe Bedding, Surround and Cover Materials**

1. Granular embedment materials to Section 31 05 17 – Aggregates.

2.3. **Backfill Material**

1. Backfill to Section 31 23 10 – Excavation, Trenching and Backfilling
2. Backfill within the public right of way to be un-shrinkable fill.

2.4. **Joint Mortar**

1. Portland cement: to CAN/CSA-A5, normal type 10.
2. Mortar: one part Portland cement to two parts clean sharp sand mixed with minimum

amount of water to obtain optimum consistency for use intended. Do not use additive..

3. **EXECUTION**

3.1. **Preparation**

1. Clean pipes and fittings of debris and water before installation, and remove defective materials from site.

3.2. **Trenching**

1. Do trenching work in accordance with Section 31 23 10 – Excavating, Trenching and Backfilling.
2. Do not allow contents of any sewer or sewer connection to flow into trench.
3. Trench alignment and depth to approval of Consultant prior to placing bedding material and pipe.

3.3. **Granular Bedding**

1. Place granular bedding material to details indicated in bedding detail OPSD 802.010 to OPSD 802.054, depending on type of soil and pipe. Use Class B bedding and place bedding in unfrozen condition. Type of soil to be defined in the field as Type 1, 2, 3, or 4 as per Health and Safety Act and Regulations for Construction Projects.
2. Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness.
3. Compact each layer full width of bed to at least 95% corrected maximum dry density.
4. Shape bed true to grade and to provide continuous, uniform bearing surface for pipe. Do not use blocks when bedding pipes.
5. Shape transverse depressions as required to suit joints.
6. Fill excavation below bottom of specified bedding adjacent to manholes or catch basins with compacted common backfill.

3.4. **Installation of Sanitary Sewer Pipes**

1. Lay and join pipe in accordance with manufacturer's recommendations and to approval of Consultant.
2. Handle pipe using methods approved by Consultant. Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
3. Commence laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
4. Do not exceed maximum joint deflection recommended by pipe manufacturer.
5. Do not allow water to flow through pipes during construction except as may be permitted by Consultant.
6. Whenever work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
7. PVC Pipe as specified in the Contract Drawings shall be installed in accordance with OPSS 410, Pipe Sewer Installation in Open Cut.
8. When any stoppage of work occurs, restrain pipes as directed by Consultant, to prevent "creep" during down time.
9. Cut pipes as required for special inserts, fittings or closure pieces, as recommended by

pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.

10. Make watertight connections to manholes and catch basins. Use shrinkage compensating grout when suitable gaskets are not available. Support connections as per OPSD 708.020.
11. Use prefabricated saddles or approved field connections for connecting pipes to existing sewer pipes. Joint to be structurally sound and watertight.
12. Temporarily plug open upstream ends of pipes with removable watertight concrete, steel or plastic bulkheads.

3.5. **Pipe Surround**

1. Place surround material in unfrozen condition.
2. Upon completion of pipe laying, and after Consultant has inspected pipe joints, surround and cover pipes as indicated.
3. Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated. Pipe surround material to extend 300 mm above crown of pipe.
4. Place layers uniformly and simultaneously on each side of pipe.
5. Compact each layer from pipe invert to mid height of pipe to at least 95% corrected maximum dry density.

3.6. **Backfill**

1. Place backfill material in unfrozen condition.
2. Place backfill material above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.

3.7. **Field Testing**

1. Repair or replace pipe, pipe joint or bedding found defective.
2. When directed by Consultant, draw tapered wooden plug with diameter of 50 mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction.
3. Remove foreign material from sewers and related appurtenances by flushing with water.

END OF SECTION

1. GENERAL

1.1. General Requirements

1. Conform to the requirements stated in the General Conditions, Supplementary General Conditions of this Specification and all addenda.

1.2. Related Work

1. Excavating, Trenching and Backfilling Section 31 23 10
2. Manholes and Catchbasins Section 33 05 14
3. Aggregates: General Section 31 05 17

1.3. References

1. ASTM C14, Specification for Concrete Sewer, Storm Drain and Culvert Pipe.
2. ASTM C76, Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe
3. ASTM C443M-85a (1990), Specification for Joints for Circular Concrete Sewer and Culvert Pipe, using Rubber Gaskets.
4. CSA A3000, Portland Cement.
5. CAN/CSA-A257, Series M92, Standards for Concrete Pipe.
6. CAN3-G401-M81, Corrugated Steel Pipe products.
7. Ontario Provincial Standard Specification 410.

1.4. Material Certification

1. Certification to be marked on pipe.

1.5. Scheduling of Work

1. Schedule work to minimize interruptions to existing services and to maintain existing flow during construction.

2. PRODUCTS

2.1. Concrete Pipe

1. Non-reinforced circular concrete pipe and fittings: to CAN/CSA-A-257-2, ASTM C14M, Class 3 designed for flexible rubber gasket joints to ASTM C443 M and CAN/CSA A257.
2. Reinforced circular concrete pipe and fittings: to CAN/CSA-A257, ASTM C76M, strength classification as indicated in the Contract Drawings, designed for flexible rubber gasket joints to ASTM C443M and CAN/CSA A257.
3. Manufactured tees for pipe to pipe connections.
4. Lifting holes:
 1. Pipe 900 mm and less diameter: no lift holes.

2. Pipe greater than 900 mm diameter: lift holes not to exceed two in piece of pipe.
3. Provide pre-fabricated plugs to effectively seal lift holes after installation of pipe.

2.2. PVC Pipe

Poly Vinyl Chloride pipe as specified in the Contract Drawings shall be in accordance with OPSS 410, Pipe Sewer Installation in Open Cut.

2.3. Pipe Embedment, Surround and Cover Materials

1. Granular material to Section 31 05 17 – Aggregates.
2. Granular A to Section 31 23 13 – Site Grading
3. Pipe embedment shall be in accordance with OPSD 802.010

2.4. Backfill Material

1. Backfill shall be granular material as specified in Section 31 23 10 – Excavation, Trenching and Backfilling.

2.5. Joint Mortar

1. Portland cement: to CAN/CSA-A5, normal type 10.
2. Mortar: one part Portland cement to two parts clean sharp sand mixed with minimum amount of water to obtain optimum consistency for use intended. Do not use additives.

3. EXECUTION

3.1. Preparation

1. Clean pipes and fittings of debris and water before installation, and remove defective materials from site.

3.2. Trenching

1. Do trenching work in accordance with Section 31 23 10 – Excavating, Trenching and Backfilling.
2. Do not allow contents of any sewer or sewer connection to flow into trench.
3. Trench alignment and depth to approval of Consultant prior to placing bedding material and pipe.

3.3. Granular Bedding

1. Place granular bedding material to details indicated in bedding detail OPSD 802.010 to OPSD 802.054, depending on type of soil and pipe. Use Class B bedding and place bedding in unfrozen condition.

Type of soil to be defined in the field as Type 1, 2, 3, or 4 as per Health and Safety Act and Regulations for Construction Projects.

2. Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness.
3. Compact each layer full width of bed to at least 95% corrected

maximum dry density.

4. Shape bed true to grade and to provide continuous, uniform bearing surface for pipe. Do not use blocks when bedding pipes.
5. Shape transverse depressions as required to suit joints.
6. Fill excavation below bottom of specified bedding adjacent to manholes or catch basins with compacted granular backfill.

3.4. Installation of Storm Drainage Pipes

1. Lay and join pipe in accordance with manufacturer's recommendations and to approval of Consultant.
2. Handle pipe using methods approved by Consultant. Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
3. Commence laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
4. Do not exceed maximum joint deflection recommended by pipe manufacturer.
5. Do not allow water to flow through pipes during construction except as may be permitted by Consultant.
6. Whenever work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
7. Joints

1. Poly Vinyl Chloride Pipe

PVC Pipe as specified in the Contract Drawings shall be installed in accordance with OPSS 410, Pipe Sewer Installation in Open Cut.

8. When any stoppage of work occurs, restrain pipes as directed by Consultant, to prevent "creep" during down time.
9. Cut pipes as required for special inserts, fittings or closure pieces, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
10. Make watertight connections to manholes and catch basins. Use shrinkage compensating grout when suitable gaskets are not available. Support connections as per OPSD 708.020.
11. Use prefabricated saddles or approved field connections for connecting pipes to existing sewer pipes. Joint to be structurally sound and watertight.
12. Temporarily plug open upstream ends of pipes with removable watertight concrete, steel or plastic bulkheads.

3.5. Pipe Surround

1. Place surround material in unfrozen condition.
2. Upon completion of pipe laying, and after Consultant has inspected pipe joints, surround and cover pipes as indicated.
3. Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated. Pipe surround material to extend 300 mm above crown of pipe.
4. Place layers uniformly and simultaneously on each side of pipe.
5. Compact each layer from pipe invert to mid height of pipe to at least 95% corrected maximum dry density.

3.6. Backfill

1. Place backfill material in unfrozen condition.
2. Place backfill material above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
3. Trench backfill shall be imported granular material consisting of Granular B Type I, or reclaimed granulars free of organics.
4. Trench backfill within the public right of way is to be unshrinkable fill.

3.7. Field Testing

1. Repair or replace pipe, pipe joint or bedding found defective.
2. When directed by Consultant, draw tapered wooden plug with diameter of 50 mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction.
3. Remove foreign material from sewers and related appurtenances by flushing with water.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 This Section includes sub drainage systems for planting areas, landscape walls and raised edges and artificial turf.

1.2 REFERENCES

- .1 ASTM International, latest edition:
 - .1 D2321: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and other Gravity-Flow Applications
 - .2 D3034, Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe
 - .3 D4491/D4491M Standard Test Methods for Water Permeability of Geotextiles by Permittivity
 - .4 F405 Standard Specification for Corrugated Polyethylene (PE) Pipe and Fittings.
 - .5 F667, Standard Specification for Large Diameter Corrugated Polyethylene (PE) Pipe and Fittings
- .2 American Association of State Highway and Transportation Officials (AASHTO)
 - .1 M 252 - Standard Specification for Corrugated Polyethylene Drainage Pipe 3”- 10” (75mm to 250mm)
- .3 Ontario Provincial Standard Specification
 - .1 OPSS.PROV 1010 Material Specification for Aggregates – Base, Subbase, Select Grade and Backfill Material

PART 2 PRODUCTS

2.1 PIPES AND FITTINGS

- .1 Perforated / Non-Perforated PE Pipe and Fittings: ASTM F 405 or AASHTO M 252, Type CP; corrugated, for coupled joints.
 - .1 Couplings: Manufacturer's standard, band type.

2.2 CLEANOUTS

- .1 PVC Cleanouts: ASTM D 3034, PVC cleanout threaded plug and threaded pipe hub.
- .2 Pipe Plug for Softscape: PVC
- .3 Pipe Plug for Hardscape:
 - .1 Cast Iron plug and housings, flush with surrounding surfaces and suitable for heavy duty exterior applications.

2.3 SOIL MATERIALS

- .1 Backfill, drainage course, impervious fill, and satisfactory soil materials are specified in Division 31 Section "Excavation and Fill."

2.4 GEOTEXTILE FILTER FABRICS

- .1 Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from to 330 gpm/sq. ft. when tested according to ASTM D 4491.
 - .1 Structure Type: Nonwoven, needle-punched continuous filament.
 - .2 Style(s): Flat and sock.

2.5 GRANULAR

- .1 Perforated Drainage Pipes: 19mm Clear Stone, 50mm min. pipe surround and minimum 300mm depth to bottom of pipe.
- .2 Non-Perforated Drainage Pipes: Granular 'A' to OPSS 1010.

PART 3 EXECUTION

3.1 EARTHWORK

- .1 Excavating, trenching, and backfilling are specified in Division 31.

3.2 PIPING APPLICATIONS

- .1 Underground Subdrainage Piping:
 - .1 Perforated PE pipe and fittings, couplings, and coupled joints.

3.3 PIPING INSTALLATION

- .1 Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.
- .2 Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.
- .3 Install PE piping according to ASTM D 2321.

3.4 CLEANOUT INSTALLATION

- .1 Cleanouts for Subdrainage:
 - .1 Install cleanouts and riser extensions from piping to top of slab or grade. Locate cleanouts at beginning of piping run in soft landscape and at changes in direction. Install fittings so cleanouts open in direction of flow in piping.

3.5 CONNECTIONS

- .1 Connect low elevations of subdrainage system to storm drainage system.

3.6 FIELD QUALITY CONTROL

- .1 Testing: After installing drainage course to top of piping, test drain piping with water to ensure free flow before backfilling. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.

3.7 CLEANING

- .1 Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for foundation and underslab drainage.

1.2 RELATED SECTIONS

- .1 Section 31 23 10 - Excavating, Trenching and Backfilling.
- .2 Section 03 30 00 – Cast-in-Place Concrete.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-34.22, Asbestos-Cement Drain Pipe.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
 - .2 CSA B1800, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
 - .1 CSA B182.2, PVC Sewer Pipe and Fittings (PSM Type).
 - .3 CSA-G401, Corrugated Steel Pipe Products.
- .4 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA)
- .5 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act (TDGA)

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal packaging material for recycling.
- .3 Divert unused concrete materials from landfill to local facility.
- .4 Divert excavated native material to local facility.
- .5 Divert unused aggregate materials from landfill to facility for reuse.

- .6 Divert unused metal materials from landfill to metal recycling facility for disposal approved by Consultant.
- .7 Divert unused geotextiles from landfill to plastic recycling facility for disposal approved by Consultant.
- .8 Place materials defined as hazardous or toxic in designated containers.
- .9 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .10 Dispose of unused asbestos cement pipe in accordance with regulations governing the disposal of hazardous materials.

1.5 SITE CONDITIONS

- .1 Examine sub-surface investigation report which is bound into specifications.
- .2 Known underground utility lines and buried objects are as indicated on plans.

Part 2 Products

2.1 BEDDING AND SURROUND MATERIALS

- .1 Coarse filter aggregate: to CSA-A23.1/A23.2, Group 1, 15 mm.
- .2 Fine filter aggregate: to CSA-A23.1/A23.2.
- .3 Flexible plastic tubing and fittings. Corrugated, Non-perforated, nominal inside diameter 100 and 150 mm. Type 1 for discharge lines, Type 2 perforated and wrapped with filter fabric for collector lines.
- .4 Geodrains: “Terradrain” 600 by Terrafix or approved equal.
- .5 Filter Fabric: “Terrafix” 270R or Mirafi 140.

2.2 BACKFILL MATERIAL

- .1 In accordance with Section 31 23 10 - Excavating, Trenching and Backfilling and as indicated on drawings.
- .2 Excavated or graded material existing on site is not suitable for backfill. Backfill shall be Granular “B” Type II, refer to drawings.
- .3 The drawings and specifications supersede all recommendations from the geotechnical report prepared by McClymont & Rak Engineers Inc. (G3947).

Part 3 Execution

3.1 EXAMINATION

- .1 Ensure graded subgrade conforms with required drainage pattern before placing bedding material.
- .2 Ensure improper slopes, unstable areas, areas requiring additional compaction or other unsatisfactory conditions are corrected to approval of Consultant.
- .3 Ensure foundation wall have been installed and approved by Consultant before placing bedding material.

3.2 BEDDING PREPARATION

- .1 Cut trenches in subgrade and place bedding material in uniform layers not exceeding 150 mm compacted thickness to depth as indicated.
- .2 Shape bed true to grade and to provide continuous, uniform bearing surface for tubing.
- .3 Shape transverse depressions, as required, to suit joints.
- .4 Compact each layer full width of bed to at least 95% of corrected maximum dry density.
- .5 Fill excavation below design elevation of bottom of specified bedding with compacted bedding material.

3.3 INSTALLATION AT PERIMETER OF BUILDING AND AREAS WITHIN FOUNDATION PERIMETER

- .1 If drain is not on footing, place a min. 100 mm of coarse filter material.
- .2 At planter locations, install geodrain against wall from finish grade to weeping tile invert elevation – temporary hold it in place until backfilled.
- .3 Lay wrapped perforated pipe directly on coarse filter material. Invert of pipe to be minimum of 250 mm below underside of floor slab. Provide pipes sloping to drains as shown on drawings. Minimum slope 1%. Connect perforated pipe to storm main.
- .4 Install minimum 150 mm of coarse filter material to sides and top of perforated pipe for perimeter drainage.
- .5 Install minimum 300 mm Granular "B" all around coarse filter material (sides and top).
- .6 Install minimum 150 mm coarse filter material cover on all sides of non-perforated pipe.
- .7 Ensure pipe interior and coupling surfaces are clean before laying.
- .8 Do not use concrete, masonry, stones, wood or any type of shim to establish pipe slope.
- .9 Connect pipes using manufacturer's recommended fittings and seal joints with sewer compound.

- .10 Protect pipe ends from damage and ingress of foreign material at each end of each day's work or work stoppage.
- .11 Place filter material after pipe installation has been inspected.
- .12 Place filter material by hand in 150 mm lifts. Consolidate by tamping lightly. Prevent displacement of pipe.
- .13 Backfill trench (1 m wide minimum) with Granular "B" lightly compacted to 95% standard density (except under paved and slab on grade areas: 98%) up to 700 mm below finished grade.
- .14 In landscaped areas place 600 mm of impermeable backfill seal compacted clay prior to the placing of top soil.

3.4 INSTALLATION UNDER PAVED AREAS

- .1 Install weeping tile around parking perimeter at concrete curbs and at drains were indicated.
- .2 Trench for weeping tile will be 300 mm wide and extend to a depth of 350 mm minimum in the subgrade below granular base.
- .3 Line trench with filter cloth. Filter cloth shall be wide enough to overlap 150 mm minimum after backfilling.
- .4 Place 40 mm of clear crushed aggregate and compact to 98% standard proctor maximum dry density.
- .5 Lay 150 mm diameter perforated pipe directly on compacted granular material. Minimum slope 0.5%.
- .6 Where weeping tile pipe joins into other piping or material at storm drains or catch basins and at all direction changes, use specifically designed fittings and seal joints with sewer compound in accordance with manufacturer's instructions.
- .7 Fold filter cloth over compacted granular. Overlap 150 mm minimum.
- .8 Backfill trench up to subgrade elevation with clear crushed aggregate compacted to 98% standard proctor maximum dry density.

3.5 BACKFILL MATERIAL

- .1 Place backfill material above tubing surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
- .2 Under paving and walks, compact backfill to at least 95% corrected maximum dry density. In other areas, compact to at least 90% corrected maximum dry density.

END OF SECTION